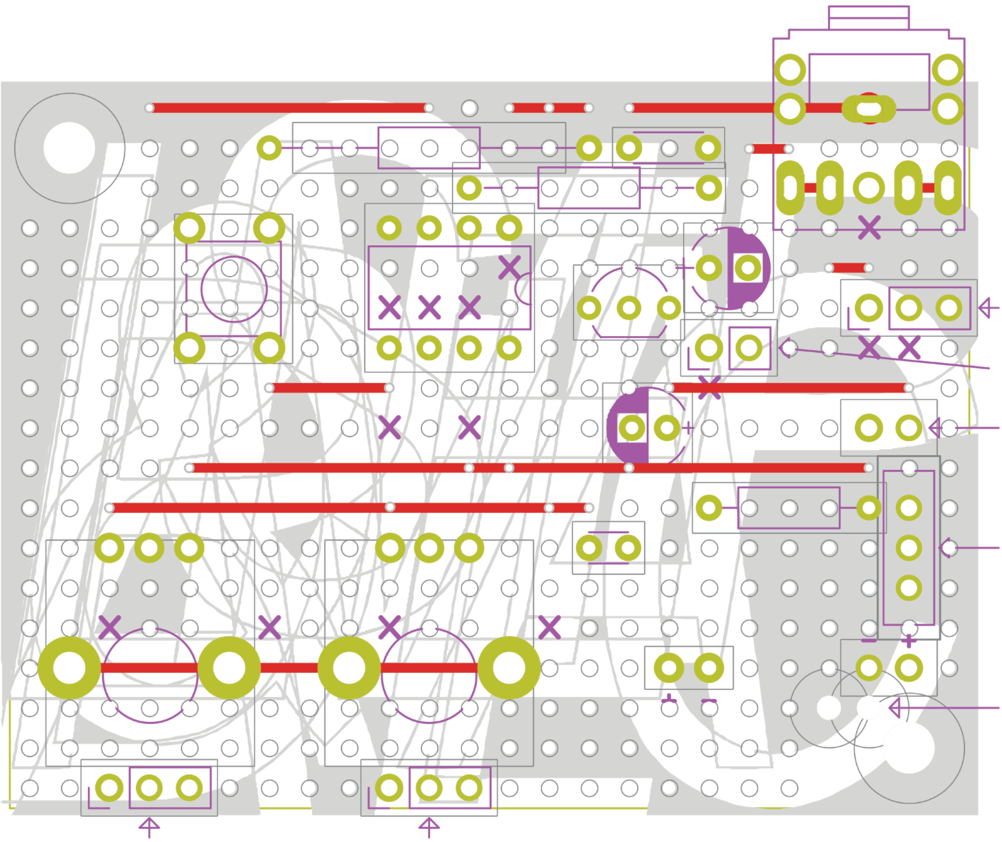
Music and Digital Media

A Planetary Anthropology



Edited by Georgina Born

UCL PRESS

Music and Digital Media

'*Music and Digital Media* is a groundbreaking update to our understandings of sound, media, digitization, and music. Truly transdisciplinary and transnational in scope, it innovates methodologically through new models for collaboration, multi-sited ethnography, and comparative work. It also offers an important defense of—and advancement of—theories of mediation.'

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'This superb collection, with an authoritative overview as its introduction, represents the state of the art in studies of the digitalisation of music. It is also a testament to what anthropology at its reflexive best can offer the rest of the social sciences and humanities.'

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- Anna Tsing, Anthropology, University of California at Santa Cruz

'This exciting volume forges new ground in the study of local conditions, institutions, and sounds of digital music in the Global South and North. The book's planetary scope and its commitment to the "messiness" of ethnographic sites and concepts amplifies emergent configurations and meanings of music, the digital, and the aesthetic.'

- Marina Peterson, Anthropology, University of Texas, Austin

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1
Introduction: music, digitisation and mediation – for a planetary anthropology

Georgina Born

Opening gambit: music decentring the digital

There can be no single, univocal account of the impact of digitisation on music; indeed, music productively decentres the digital. The goal must be to develop methods of tracing out and doing justice to the multiple ways in which music and the digital become enmeshed, to map the unruly topologies etched by and between distinctive sites and lineages of digital music, and to become alert to how the mediation of music cannot be reduced to its technological mediation alone – however world-changing those technologies may appear to be. These several ambitions drive this book.

How, in this light, should we understand the momentous changes to music and musical practices worldwide attendant on digitisation and digital media? Certainly, music is at the forefront of the turbulent changes to the production, distribution and reception of culture galvanised by digitisation, something of 'a testing ground for technological change' (Hesmondhalgh and Meier 2018, 1557). The music business was 'the first major sector of cultural production to confront the challenges and opportunities offered by the internet' (Hesmondhalgh 2009, 58), and given the notoriety attached to file-sharing and its consequences, music has also been at the epicentre of political debates over the internet's impact on cultural economies (David 2010; Leyshon 2003). At the same time, digital compression formats like MP3 heralded 'the end of the artificial scarcity of recorded music' (Sterne 2012, 188) as music became

‘digital content’ to download, upload and stream, stoking the global rollout of mobile telephony (De Beukelaer and Eisenberg 2020). Mobile media markets have, then, ‘been inseparable from mobile sound culture’, driving a ‘profound intensification of sonic output… [including] musicalized ringtones, digital sound files, digital broadcasts’ and more (Gopinath and Stanyek 2014, 2). As a result of these multiple changes, the entwinement of music and digitisation has inflamed popular consciousness and media commentary in recent years, often linked to discourses of ‘revolution’ or ‘crisis’ in which music is portrayed as emblematic of the social, economic and legal disruptions catalysed by digitisation *tout court*.

From a less technocentric standpoint, the ethnomusicologist Martin Stokes has observed how cheap digital sound reproduction and the proliferation of small but powerful information technologies have become the bearers of ‘music as an active and engaged means of world-making’ across the global South.[1] They have accelerated processes of musical cosmopolitanism while also deepening ‘the experiential connections between music and the broader sensorium of globalized modernity’. When analysing music’s circulation in these conditions, Stokes adds, ‘we need to be sensitive to the subtle distinctions and discriminations that any concrete and historical situation of music world-making will generate’ (Stokes 2008, 10). The contributions to this book pursue just such an approach, unveiling an array of distinctions linked to ‘concrete and historical situations’ in which digital music is entangled.

Yet this is no ordinary edited book: it presents the findings of the coordinated experimental research programme ‘Music, Digitisation, Mediation: Towards Interdisciplinary Music Studies’ (or MusDig).[2] MusDig brought together a group of scholars each of whom undertook an ethnographic study. Its ambition was less to provide an encompassing global survey of the impact of digitisation on music than to interrogate how the digital modulates intersecting histories via specific situations and events. The group was unified by taking the ‘digital’ as its starting focus, but – as became obvious in our empirical research – the significance of the digital was manifold. To convey this range, the chapters encompass: the emergence of a Kenyan ‘born-digital’ music industry; the inventive struggles of digital popular musicians in Buenos Aires to make a living, framed by wider Argentine political visions of digital culture; how digital folk music archives in North India have generated contending aural public spheres; the contrasting forms of labour and governmentality immanent in music’s online circulation and consumption on Spotify and an extralegal platform; the aesthetics, practices and institutions associated with the

global music software program Max; how digital arts policies have 'remediated' modernist electroacoustic music genres among musicians in the Canadian city of Montreal; the responses of digital art music trainings in British universities to the mutating boundaries between academic and nonacademic, digital and post-digital, art and popular musics; and the intermedial aesthetics and practices emblematic of a spate of influential internet-mediated music genres. The chapters map diverse yet symptomatic manifestations of that fertile intersection where contemporary music meets the digital.

As well as popular commentaries, the entanglement of music and digitisation has fuelled a steep growth of scholarship across disciplines. In some cases this builds on the central place of technology in popular music studies since its inception in the early 1980s as an interdisciplinary offshoot of sociology and cultural studies (Prior 2018; Théberge 1997). In parallel, the early 1980s were a 'watershed moment' in the takeoff of digital music (Théberge 1997, 5). The advent of a raft of new commercial digital music technologies – among them the Yamaha DX7 and Fairlight CMI, programmable drum machines, samplers, sequencers and audio software, along with the earliest desktop computers and digital audio workstations (DAWs) and the MIDI (Musical Instrument Digital Interface) industry standard (Diduck 2018) – transformed the sonic resources available to musicians as well as the nature and practice of performance, recording and production. In 1982 the CD entered the mass market, and 1983 saw the adoption of the TCP/IP network protocol that remains a core infrastructural element of the internet (Prior 2010). Given this slew of innovations and others before and since, the digitisation of music is best conceived as 'a relatively long, transformative process of economic, technological, social and cultural change that has taken place over a half-century or more' (Théberge 2015, 329) – or, in the case of the MP3 format, has a history a century long (Sterne 2012, 7–9). For Paul Théberge, although 'virtually every form of music making has been affected' by digitisation, its influence has been uneven 'across different genres of music, and across different social groups and industrial sectors'. As a result, the complex interactions between music and digitisation should not be narrated as a unified history but 'as numerous, intersecting histories that cut across a range of social, cultural, institutional and industrial practices' (Théberge 2015, 329, 337). The chapters that follow pursue this analytical stance, constructing links between such intersecting histories and ethnography; three of them extend this approach to the global South through salient developments in India, Kenya and Argentina.

Ultimately, the MusDig research and all attempts to gauge and narrate epochal shifts in the appearance and prevalence of media technologies – such as the putative transition from analogue to digital – have to take a view on the perennial debates over technological determinism as they become manifest in maximal or minimal claims about the causal influence of such technologies on historical change. To exemplify maximal we might take Timothy Taylor's conviction that 'the advent of digital technology in the early 1980s marks the beginning of what may be the most fundamental change in the history of Western music since the invention of music notation in the ninth century' (Taylor 2001, 3). Taylor is not alone in giving great explanatory weight to the digital in shaping epochs of music history (Rothenbuhler and Peters 1997), and recent reflections on the cogency of technological determinist arguments tend to lend him support (Devine 2019, 198–200; Peters 2017). To illustrate minimal or, better, multifactorial accounts, we can cite Jonathan Sterne's insistence that, in asking 'fundamental questions about creativity and culture, technology and humanity', we will gain greater understanding of the role of digital technologies if we eschew 'an exceptionalist stance, where we treat the digital as a revolutionary or prima facie determining factor, and instead consider it in the vast traffic of practices' (Sterne 2006, 107). Against this background, a striking contribution of the chapters that follow is to show that debates over technological determinism are in principle *undecidable*: rather, the chapters convey by reference to ethnographic analyses that we should understand change as resulting from multiple trajectories that as well as being musical and technological may be cultural, social, political, economic and legal – as, through their 'pluri-potentialities' and emergent interferences (Connolly 2011), such trajectories bear on and shape particular musical assemblages. Importantly, the nature of these trajectories and of the interferences between them, and their causal influence on key changes, are likely to differ in – and must be calibrated for – each situation. In short, the debate cannot be resolved philosophically. Instead, explanatory light will be shed as a result of the generative clash between empirical research and theory (on which more later), especially through insights – drawn, optimally, from ethnography and history – that enable such trajectories to be identified and their relative causal weight assessed. Hence the need for studies that link the 'vast traffic of practices' to 'intersecting histories'. To put flesh on this methodological argument: if in Kenya and India (chapters 2 and 4) digitisation in its varied manifestations has generated significant shifts in the conditions facing popular and folk music and musicians, in Argentina (chapter 3), in

contrast, economic, political and legal circumstances have acted as a giant break on certain kinds of digitally-fuelled transformations unfolding elsewhere.[3]

In line with its agnosticism about the causal influence of technology, the MusDig research group adopted a methodological tactic of decentring the digital in order both to de-essentialise this self-evident category and to probe its existence as, precisely, a participant in complex trajectories. This tactic comes easily to ethnographers – but it is not limited to them. A good example of such decentring at macro scale is Paul Théberge's analysis of the part played by 'transectorial innovation' between the electronics, computing, consumer audio and musical instrument industries in changing music technology markets in the late twentieth century, with innovations migrating both ways – including from firms like Yamaha, Atari and Roland as they diversified and exported innovations in chips and peripherals to the computing sector (Théberge 1997). Similarly, David Hesmondhalgh draws attention to how an interplay between rival capital sectors – the telecommunications, software and cultural industries – propelled by 'government visions of future prosperity and comparative advantage … in global "knowledge economies"' (Hesmondhalgh 2009, 59–60) drove technological developments shaping digitisation in the music recording industry (Bakker 2005). In the UK, 'knowledge economy' policies accompanied rising government interest in the newly-named 'creative industries', in which music took a leading role. In the wake of New Labour's 1997 electoral victory, 'the state's primary interest in music had become its economic potential, as a source of export earnings, inward investment and employment' (Frith et al. 2009, 75). If such macro analyses appear to take us very far from ethnographies of digital music, this is not the case: it will become clear that creative industries policies play a telling part in several MusDig studies, pointing also to the productivity of crossing scales when analysing ethnographic material (Fortun 2016; Strathern 1995, 2018).

Anthropology in the middle

In addressing the generative intersection between music and the digital, this book not only presents but advocates what might be called an anthropology in the middle – in several interrelated senses. The most obvious is temporal: given the relentless churn of digital technologies, each study is inevitably located in the middle of ongoing processes and events. This is an anthropology 'comparing histories or societies in change' (Peel 1987, 35). The book charts fast-receding ethnographic presents[4] as well as

histories pressing on them and futures emanating from them – futures with no perceptible telos. As Gayatri Spivak puts it, ‘the future is decisive only because, being unpredictable, it is not susceptible to decidability’ (Spivak 2003, 46–7). The chapters tell what are unfinished stories, veering between bird’s eye overviews of global and regional forces and immersion in local flux. Yet time is not just a background to the events portrayed, for our research subjects are themselves ‘making time’ through strenuous efforts to shape presents, pasts and futures (Born 2015). The chapters convey the vital contributions not only of our interlocutors but of music, digital technologies and a host of other entities and trajectories to such temporalising processes (Munn 1992).

A second sense of anthropology in the middle stems from how the MusDig researchers became entangled in the very processes we were studying, with the risk of ‘contaminating’ them. Middleness took musical, social and intellectual forms when individuals who started out as our research subjects became collaborators, and when we ourselves came to be defined by our interlocutors as collaborators (Rabinow and Stavrianakis 2013). Andrew J. Eisenberg, for example, became an informal advisor to the Nairobi production house Ketebul in their documentation of the history of Kenyan popular music (chapter 2), as well as entering into dialogue with Nairobi legal and industry figures working on Kenya’s emerging music-copyright regime. Alexandrine Boudreault-Fournier collaborated with Laurent Blais, an interlocutor, when writing on Montreal’s Piu Piu subculture (Boudreault-Fournier and Blais 2015, 2016), and made a Canadian funding application to support collaboration with Cuban scholars from the Centre for the Study of Cuban Culture. For my part, several musicians invited me to participate in their curated events or research projects; I taught ethnographic methods at several field sites; and on the basis of research on gender and class disparities in British music and music technology degree courses (Born and Devine 2015), Kyle Devine and I became involved in movements to promote diversity in music-technology conferences and European ‘new music’ festivals. While these activities were important and fruitful, collaboration is no panacea for anthropology’s ethical and political dilemmas (Holmes and Marcus 2008; Rouse, Lederman et al. n.d.). Middleness speaks reflexively, then, to the productive movement between ethnographic identification and distanciation – and to how ethnography participates in the very currents it purports to diagnose. ‘Those who believe they can purify their objects in fact intervene actively in the significance of the object they observe’, cautions Isabelle Stengers (Stengers 1997, 17). Yet the chapters convey what were often unforeseen directions, and our

capacity to be surprised by our fieldwork points to the limits of the 'contamination' effect.

If being in the middle of events and contamination speak obviously to ethnographic concerns, then a third sense of middleness is the commitment evident in MusDig to interdisciplinary enquiry when researching music and digitisation. In general, for Geoffrey Bowker, 'contemporary scholarship demands interdisciplinary skill', and new objects of study call on 'the ability of investigators to integrate multiple epistemic viewpoints' (Bowker 2018, 207). In turn, W. J. T. Mitchell and Mark Hansen advise that we 'take seriously the "middleness" evinced by the term *media* and seek to position media studies as an intermediary … across and between disciplines' (Mitchell and Hansen 2010, xiv). The interdisciplinarity of the MusDig programme took its bearings not only from anthropology and sociology, musicology, ethnomusicology and sound studies, but relevant area studies, digital/media studies and science and technology studies – a mix personalised by each researcher according to background, inclination and need. Yet, again, such interdisciplinarity was not limited to our work; it was also a property of the diverse worlds we researched which in myriad ways interwove musical, cultural and technical practices and knowledges – just as our interlocutors were reflexive about their own capacities as knowledgeable and theorising subjects.

A final sense of anthropology in the middle goes to the etymology of the word 'medium'. Mitchell and Hansen, citing the OED, write that medium is 'derived from the Latin for "middle, centre, midst, intermediate course, [or] intermediary," … whether a token of exchange, a material used in artistic expression, a "channel of mass communication," the "physical material … used for recording or reproducing data, images, or sound," [or] a substance through which a force acts on objects at a distance or through which impressions are conveyed to the senses" (including "the substance in which an organism lives")' (Mitchell and Hansen 2010, xi). This fecund cluster, they point out, invokes a lineage of thinking about 'ourselves as "essentially" prosthetic beings' (2010, xii), a lineage that includes Marshall McLuhan, Andre Leroi-Gourhan, N. Katherine Hayles and Bernard Stiegler. In what follows, conceiving of media as 'in the middle' in these terms weighs against any assumption that media intercede 'in otherwise more primary, fundamental, or organic relationships' (Sterne 2012, 9), just as it militates against media-centrism. Rather, we take digital music to participate in broader processes of mediation, pointing to 'the irreducible role of mediation in the history of human being' (Mitchell and Hansen 2010, xii). Mediation returns as a conceptual pillar of the MusDig programme.

On nonlinear narratives and the performativity of research funding

The remainder of this introduction sets out a common methodological and conceptual scaffold for the MusDig programme, followed by overviews of individual chapters. Each chapter presents the findings of one of the ethnographic studies carried out by the MusDig research group which, in addition to myself, included Geoff Baker, Alex Boudreault-Fournier, Aditi Deo, Kyle Devine, Blake Durham, Andrew J. Eisenberg, Christopher Haworth, Joe Snape and Patrick Valiquet. I want to affirm my gratitude and debt to these brilliant colleagues, who gave vision and substance to what began as speculative plans. Working together was exciting and demanding. We were fortunate to be supported by the European Research Council's commitment to response-led basic research. Most members of the group had two years of funding, the first absorbed by multisited fieldwork, the second by collaborative discussion, comparative analysis and writing up. The fruits of the ethnographies are multiple, and while the chapters give comprehensive portraits, additional publications augment them.[5]

A feature of the MusDig research, as will soon become apparent, is its comparative design, and in two respects. Most of the individual ethnographic studies themselves contain comparison, and comparison is also built into the relationship *between* the ethnographies. This rich latticework of comparison makes possible a series of analytical and conceptual operations that fill out the postlude to this book. Structured in this way, the book itself proffers a nonlinear narrative. The reader has options: go from this introduction to the chapters, and thence to the comparative discussion in the postlude, which is likely to be enlivened by taking this route; or jump from the introduction to the postlude, and take its comparative mindset to the chapters. This signposting is intended to remind readers that the routing decision is in their hands.

It is a significant feature of the European Research Council (ERC) funding underpinning MusDig that it enabled a scale of comparative ethnographic research that is notable for being so rare. In this way MusDig responded to a well-rehearsed challenge facing both anthropology and music studies: how to get beyond the tendency for research to fall on one side of two extremes – either fragmentary case studies consumed by particularity, from which it may be thought unjustifiable to draw wider conclusions (Goldthorpe 2007), or totalising accounts that absorb any particularity into overgeneral claims.[6] MusDig aspired to fill the gap by

producing research on a sufficient scale – nine ethnographies in all – that it becomes possible to develop comparisons that may point felicitously to larger findings, and even forms of explanation. This solution is one that depends on a level of funding forthcoming only from behemoth schemes like the ERC's,[7] schemes that by their very nature are performative – shaping the scale and forms of the research the funding elicits. It is an abiding irony of the MusDig programme that it is not only itself the creature of such a scheme, but scrutinises the effects of this kind of funding in the worlds being researched as it engenders a cascade of developments in university-based digital music and arts in the global North (chapters 7 and 8). Here is middleness yet again: in terms of the promise of an intermediary pitch of analysis between the fragment and the general, and in terms of the folding of our ERC experience back into understanding the digital music worlds we researched.

Designing MusDig: relational musicology + post-positivist empiricism

From its inception, the MusDig research programme aspired to address three challenges. First, through an ambitious set of ethnographic studies, to analyse the ways in which music is being transformed through association with digital media – while itself transforming digital media. Second, to leverage this research material in building an interdisciplinary mix of disciplines, as mentioned above, adequate for the analysis of contemporary music's technologically-mediated condition. And third, to bring these efforts into dialogue with core themes of social and cultural theory so as to 'musicalise' such topics as mediation, sociality, materiality and ontology as illuminated by our work – topics addressed in each chapter as well as this introduction and the postlude.

The design of the first wave of six ethnographies was guided by these objectives. Each project was honed at the outset through dialogue to fit the individual researcher's regional, country- or genre-specific interest and experience. In parallel, we took pains to identify topics sensitive and responsive to local concerns and conditions, while also having the potential to contribute to the comparative scope and power of the programme as a whole. This approach underlay the research carried out by Eisenberg in Kenya (chapter 2), Baker in Argentina (chapter 3), Deo in North India (chapter 4), Boudreault-Fournier in Cuba and Montreal,[8] Valiquet in Montreal (chapter 7), and my own work in the UK and Europe (chapter 8). Through this multifaceted research design we

sought to evade both anthropology's tendency to adopt a regional orientation, often freighted with pre-formatted preoccupations, and other 'privileged material research objects' or canonic research sites of the social sciences (Krause 2021).

A second wave of research took place in the programme's later years, complementing the first six studies and diverging from standard ways of constructing or locating the field (Amit 2003; Coleman and Collins 2006). In this phase we worked with the digital experimentally to the fore; the results were three studies authored collaboratively by the ethnographer and myself. Durham examined music's online circulation and consumption through comparative fieldwork on the extralegal peer-to-peer site 'Jekyll' and the commercial streaming platform Spotify (chapter 5);[9] Snape undertook what is to our knowledge the first ethnography of a global software package, the interactive music platform Max (chapter 6); and Haworth adapted a digital sociology tool, Issue Crawler, hybridising it with ethnographic and historical methods to research a series of prominent internet-mediated music genres (chapter 9).

At the same time, the MusDig programme is designed to embody what I have called a relational musicology (Born 2010c).[10] It does this by integrating ethnographic studies of popular, folk and art musics from the global South and North as they are enmeshed in digital mediation, while avoiding any a priori distinction between offline and online spheres of experience. In this light we approached the scenes we set out to investigate as distinct but contiguous musical universes 'that demand to be analysed both in their singularity, as heterogeneous unities, and comparatively and relatedly, in their complex co-existence and co-evolution' (Born 2010c, 222). Inasmuch as 'identity is only a particular case of difference' (Viveiros de Castro 2014, 120, n.78), we sought to grasp the substantive identities of the digital music assemblages we encountered as they are manifest relationally through differences 'of aesthetic and practice, of discursive, social and technological mediations' (Born 2010c, 222).

To be sure, the relations, differences and 'complex co-existence' at issue in relational musicology take a number of forms (Born 2010c, 225–30). In the MusDig studies they appear comparatively (1) as contrasts, (2) as oppositions or antagonisms, or (3) as transversal connections between contiguous music formations – and commonly as mixtures of all three. To illustrate *contrasts*: Baker's portrait of digital *cumbia* in Buenos Aires (chapter 3) explores three variants of the genre that exhibit distinctive sounds, organisational forms, and economic and media strategies, but otherwise have no mutual reference. In a similar way, Eisenberg's account of the rise of digital music production in Nairobi

(chapter 2) investigates three contrasting independent ventures, each espousing their own aesthetic, philosophy and business model. In terms of *oppositions*: Valiquet's research maps the contending ideologies, materialities and aesthetics of Montreal's academic electroacoustic music as well as those of its vocal antagonists, the city's nonacademic noise scenes (chapter 7, Valiquet 2014). And regarding *transversal connections* and *mixtures*: Deo's comparative portrait of organisations engaged in the digital archiving of Indian folk music (chapter 4) underscores their vivid differences but also mutual awareness and, in some cases, sponsorship and other direct links; Durham's account of music's online circulation and consumption (chapter 5) points not only to ideological and architectural differences but to transversal borrowings between Spotify and Jekyll, its extralegal other; Snape's chapter contrasts the material characteristics of the Max software with those of the commercial DAW, Ableton Live, while also analysing growing technological and organisational linkages between the two (chapter 6); and my chapter on contrasting species of digital art music in the UK charts loosely networked academic music scenes, some of them incubating tendencies that are ideologically and/or aesthetically opposed (chapter 8). In pursuing a relational musicology, the MusDig programme therefore exemplifies a comparativism 'that does not have similarity or identity as its (formal or final) cause' (Viveiros de Castro 2014, 112). In MusDig, in effect, relational musicology meets contemporary anthropological comparativism, honing the conceptual acuity of that paradigm.

From another vantage point, the methodological stance taken by the MusDig ethnographies is akin to that articulated by Anna Tsing when, in *Friction* (2005), she writes of the need for 'patchwork ethnographic fieldwork' in situations where 'it is impossible to gain a full ethnographic appreciation of every social group that forms a connection in a global chain' (Tsing 2005, x). Tsing is responding to the efforts to reconceptualise ethnographies of the global set out in a spate of publications through notions of multisite ethnography (Marcus 1995), global assemblages (Ong and Collier 2005), and anthropologies of the global (Ong 2006). In *Friction* Tsing clarifies that 'the term "global" here is not a claim to explain everything in the world at once. Instead, it introduces a way of thinking about the history of social projects … [that] grow from spatially far-flung collaborations and interconnections' (Tsing 2005, ix), and she insists that 'the only ways I can think of to study them are patchwork and haphazard' (2005, xi). Taken to digital music, similar sentiments were felt by the MusDig group when tracing the mobile topologies characterising online-and-offline, local-and-translocal fieldwork – what Jenna Burrell calls

‘heterogeneous networks’ (Burrell 2009, 182). As Burrell contends, digital ethnography is most productive when it abandons both ‘the notion of a conventionally bounded field site’ and the tendency to draw ‘a sharp division between offline and online spaces’, attending instead to the ‘vast terrain and complex intermingling of cultural spaces’ characteristic of digital ethnography (2009, 184–5).

In later chapters the digital becomes a substantive seam running through the richly contextualised ethnographies. Yet in each case, what the digital is and connotes is localised and particular, and the framing of this ‘local’ varies in scale and shape, often taking the paradoxical form of a translocalised and/or transnationalised ‘local’ as a consequence of the multilayered network topologies set in motion by the internet and digital media as they mediate music. In Baker’s account of the Buenos Aires-based digital *cumbia* label ZZK, to take one example, not only are the internet and social media key arenas in which the label performs its existence, identity and aspirations, but ‘IRL’ transnational economic linkages and transcontinental touring networks embellish those aspirations. Offline and online interpenetrate in Baker’s ethnography in ways that characterise both professional and amateur music-making today – just as ZZK’s struggles for profile and survival dramatise the permeable border between those very categories. Durham’s chapter, in turn, traces multilayered topologies entirely online in the guise of an elaborate matrix of ‘community’-developed, rule-governed practices enabling music’s curation and circulation on the transnational, extralegal peer-to-peer platform, Jekyll.

There was therefore no common template governing the MusDig studies’ design, and we did not attempt to impose any unity.[11] Rather, we were interested in the comparative reverberations that might be thrown up between the ethnographies by taking to the field a common group of broad, theory-laden conceptual themes or foci that might – or might not – prove germane to the individual studies. The themes included: creative practices, aesthetics and genre, materialities and literacies, industry and institutional restructuring, circulation, consumption/prosumption, subjectification or the genesis of new forms of musical subjectivity, politics, historical transition or periodisation, and intellectual and cultural property. We prepared for fieldwork collectively by reading and discussing interdisciplinary literatures attached to these themes, and we took these literatures and discussions into account in choosing field sites and refining each study’s focus. Hence, the literatures and the theories and concepts associated with them informed our fieldwork, while also being ‘tested out’ and subjected to scrutiny, with the potential to be enhanced or transformed,

affirmed or refuted when held up against emerging ethnographic findings. This constitutes an epistemological stance that, after Whitehead and Deleuze, I term post-positivist empiricism (Born 2010a, 2010b). Destabilising the 'master-servant' paradigm commonly assumed by social and media theorists, it entails an altered conception of the relations between theory and empirical research, rendering the empirical and conceptual '"contiguous" or on the same plane' (Stirling 2019, 15).

Deleuze develops his idea against rationalist philosophies in which 'the abstract is given the task of explaining, and it is the abstract that is realized in the concrete'. Rather than explain away empirical complexities in terms of pre-given abstractions, he contends, 'empiricism starts with a completely different evaluation: analysing the states of things, in such a way that non-pre-existent concepts can be extracted from them' (Deleuze 1987, vii–viii). From this perspective, the strength of ethnographic fieldwork is that it throws up material and findings which cannot be incorporated into existing frameworks and demand that they be extended. It is characterised by a movement between, on the one hand, prior substantive knowledge and theoretical approach and, on the other, the new insights produced by fieldwork; 'each amends the other in a process of refinement of working analyses' (Born 2010b, 198). In this way fieldwork involves 'an oscillation between phases of more deductive and more inductive work', becoming 'a subtle tool for the application and the amendment of theory', with the effect that empirical research can 'have theoretical effects [and]… serve as a site for conceptual invention' (Born 2010b, 197–98). The alternative, Christabel Stirling observes, is that the ethnographer seeks out empirical material merely to reaffirm theory, so that 'the world is, once again, reduced to the concept' (Stirling 2019, 15). In short, post-positivist empiricism rescues empiricism from a particularly narrow understanding of the term; it offers a radically different methodology to that absolute separation of theory from the '"core business" of anthropological ethnography' that is often taken to prevail today (Boyer 2015b, 235), and it joins critics of universalising or 'radial' theories that appear to 'explain everything, but… always [give] the same answer' (Boyer and Howe 2015, 29).

No equivalence: singularity, comparison, planetarity

If 'comparative method [is] an essential and distinctive feature of [anthropological] knowledge' (Boyer and Howe 2015, 17), then, as an experiment in comparative, interdisciplinary and collaborative ethnography, the MusDig programme refashions anthropological

comparativism. To be sure, we make no claim that MusDig captures a totality, nor that it is organised around neat comparative templates. Nonetheless, as indicated before, most of the ethnographies were built around internal comparison, and in addition, after our fieldwork, we engaged collaboratively in producing internal working papers about comparative lines of analysis crossing the ethnographies. Certain vectors of comparison therefore emerged between the studies – vectors that are pursued in the postlude. Yet we would not want to overemphasise the value of comparison. The MusDig group was aware of our studies' incommensurabilities: of the singularity of our sites, our subjects and their worlds, and ourselves as ethnographers, and of how our data are imprinted by these iterative differences. Do these singularities render the ethnographies incomparable? Not entirely, as will become clear. At the same time, in the course of our work we became aware of the ethical, political and epistemological *limits* of comparativism – for not everything that we wanted to grasp was captured by comparison. So the ethos of MusDig was to embrace the value of singularity *and* comparison: the chapters seek to render the irreducible singularity of each ethnographic situation; yet we also engage in generative comparison, in the terms of relational musicology, as and when productive – avoiding 'radial' theories and catalysing 'non-pre-existent concepts'. Today, this attitude appears uncommon in anthropology, and we offer it as a technique for mitigating disciplinary solipsism. On the basis of the chapters, the postlude elaborates on this methodology.

Tackling analogous methodological challenges, Tariq Jazeel illuminates the powers of singularity and 'incomparable geographies' in decolonising geographical knowledge. He points to the risks evident even in studies motivated by decolonial critiques that 'such work unwittingly disfigures the precise contours of the places and socio-spatial formations' that are the objects of research, 'drawing them into implicit and reductive forms of comparison' (Jazeel 2019, 5). In urban geography this can take the form of 'integrationist modes of comparison that … pull all cities into urban studies' unfortunate history of categorization and developmentalism' (2019, 6). Yoked to notions of the 'global', he observes citing Aamir Mufti, such research tends to place its objects on a 'plane of equivalence' that renders 'a vast and heterogeneous range of practices … available for comparison, classification, and evaluation' (Mufti 2016, 11). As an alternative, Jazeel proposes 'a methodological disposition toward singularity' that is at once an 'ethical imperative for decolonizing' knowledge, one that moves 'the geographical imagination toward alterity' (Jazeel 2019, 6). Dethroning the global as a nodal term of comparativism,

he turns to Gayatri Spivak's idea of *planetarity*. For Spivak, planetarity stands against the abstract equivalence wrought by notions of the global and globalisation, their 'imposition of the same system of exchange everywhere'. Instead, 'the planet is in the species of alterity' (Spivak 2003, 72): it leads out of 'reductive comparisons and into the ethico-conceptual space of singularity' (Jazeel 2019, 8).

Jazeel clarifies, however, that his manifesto is directed not against comparison per se but a dominant style of theory-led, subsumptive comparativism. As opposed to the search for equivalence or confirmation of the same, he advocates a stance akin to post-positivist empiricism in which comparative empirical research is oriented 'toward conceptual *revision* and *experimentation*' (Jazeel 2019, 7). Warning against what Edward Said called theory's 'bad infinity', how it can become 'too inclusive, too ceaselessly active and expanding a habit of mind' (Said 1983, 239), Jazeel observes that singularities 'demand a relatively undisciplined kind of disciplinary knowledge production' (Jazeel 2019, 12) – a commitment familiar to the MusDig group. It is in homage to Spivak and Jazeel that this book invokes the planetary in its title.

Music as a fulcrum for (digital) anthropology

If through its post-positivist empiricism the MusDig programme resists any distinction between ethnography as particularistic 'idiographic' documentation and anthropology as comparative 'nomothetic' inquiry (Ingold 2008), then MusDig also aspires to reshape the relationship between music and anthropology – including the subfield of digital anthropology. Our work sets out to indicate how music as a ubiquitous sociocultural practice can act as a fulcrum for (digital) anthropology: a lever or stimulus prompting conceptual and methodological invention.

Why music? One advantage of refracting digital anthropology through music is, once again, to decentre the digital. For alongside those recreational, communicative and social uses of digital media that have been the mainstay of digital anthropology (Boellstorff 2008; Horst and Miller 2006; Miller 2016; Miller and Slater 2000; Slater 1998), musical uses are pervasive, apparent in music's role worldwide in the take-up of mobile phones and the internet, and in the creation of commercial digital markets. Through music, digital anthropology enlarges its sensory and conceptual scope – from functional and phatic modes of communication that cast light on the 'banal, as well as profound, presence [of digital media] in everyday life' (Coleman 2010, 489) to what are equally

pervasive aesthetic, artistic and imaginative facets of digital practice. Augmenting digital anthropology's concern with quotidian practices and the production of 'user-generated content', music has long been the locus not only of prosumption but of specialised and amateur creative digital practices (Born 1995; Théberge 1997). Moreover, music productively extends the 'genealogy of hacking' (Dunbar-Hester 2020, 39) that has occupied the centre ground of the anthropology of computing (Collins 2006; McLean 2002), suggesting that generic hacking, for all its diverse manifestations and different 'moral genres' (Coleman and Golub 2008; Kelty 2019), cannot stand in for all expert and politicised engagements with coding and the internet (see chapters 5, 6, 7, 8 and 9).

Indeed, music acts for anthropology as a kind of digital avant-garde in two senses. In a first, political-economic sense, music has been at the cutting edge both in busting copyright capitalism through its trialling of 'sharing economies' (David 2013, 2017) and in forging platform capitalism (Srnicek 2017) in the guise of music streaming services and their novel economic models, social, sensory and affective entailments. In this vein, Durham and I (chapter 5) coin the concept of rentier musical capitalism, proposing that 'music's online circulation and consumption represent … a rich experimental seam for the trial and invention of new capitalisms themselves' (p. 213). It follows that music requires that an array of institutions generally absent from digital anthropology enter the analytical terrain: streaming services and record labels, production houses and creative economy incubators, copyright and policy bodies.[12] In a second sense, music demands that digital anthropology attend to the material, epistemological and ontological implications of the digital data economy that erupted from the 2000s (Knox and Nafus 2018). For digitised music has again been in the vanguard, its consumption instrumentalised through the extraction of user data by streaming services like Deezer and Spotify (chapter 5) whose normative, 'dividuated individual' listener has musical tastes that do not conform 'to some durable norm, but … [fluctuate] according to context, affect, setting' and similar factors (Drott 2018, 350). In parallel, music itself morphs into a searchable data space, its unruly being 'cleaned up' to produce corpuses ripe for machine learning (Serra 2017; Sturm 2014), processes immanent in the commercial instrumentalisation of music recommendation and genre recognition (Born 2020; Drott (in press)). In all these ways music expands the horizons of digital anthropology.

At the same time, our focus on music in this book enlivens and reconfigures the very disciplinary boundary between music and anthropology, a boundary dramatically clear in the ways in which music

has been deemed marginal to anthropology. No doubt this marginalisation is due in part to how music is considered to 'belong' to another discipline, ethnomusicology – despite its intimate links to ritual and to a series of arts with which anthropology does engage (poetry, dance, theatre, film). The tendency to cordon off music from anthropology via ethnomusicology is contested in numerous ways by the MusDig research.[13] This may be a timely intervention, for graduate anthropology students are, in my experience, increasingly keen to embrace music as a lens on wider sociocultural processes. This book therefore offers an entry point for students and colleagues impatient to usher music into anthropology's corral, for it demonstrates how music enlarges anthropology while demanding to be analysed with reference to classic preoccupations of anthropological theory: the social and material, politics, temporality and ontology. Yet a core conviction is that research on music holds most promise for anthropology when it obviates disciplinary purism and is invigorated by other salient disciplines. There could be no anthropology of digital music, we contend, without forays into, inter alia, theories of mediation, digital/media studies, sound studies and science and technology studies (Porcello 2005).

Music, anthropology, decoloniality, ontology – recasting boundaries and substances

A recent volume – *Remapping Sound Studies*, edited by Gavin Steingo and Jim Sykes – attempts a similar task, recasting the boundaries between music, sound studies and anthropology in response to decolonising imperatives. In the coming pages I want to highlight several features of the MusDig research through a dialogue with this book. Translating wider debates (Chakrabarty 2000; Comaroff and Comaroff 2011) into music/sound studies, the volume argues trenchantly against sound studies' 'neglect of Africa and Asia' and for 'listening to and from the South' (Steingo and Sykes 2019, 6, 8). The MusDig research group would heartily agree: its work is predicated too on the need for such change, as is its concern with singularity and planetarity. It bears noting that even though our ethnographies in Kenya, Argentina, India and Cuba mainly trace diverse appropriations of commercial technologies from the North, this does not mean that they promulgate 'a neocolonial … narrative in which the West remains the protagonist' (Steingo and Sykes 2019, 7). Nor do we mistake this focus for an analysis of the entire 'constitutive technicity' (Steingo and Sykes 2019, 11) of our field sites. In each study

we took our subjects' lead about which technologies and materialities were salient, 'looking at how "global" technologies are localized' (Steingo and Sykes 2019, 14).

Three themes stand out in *Remapping Sound Studies*, and each elicits a constructive response from the MusDig research. The first turns on the vital correction initiated by Brian Larkin (Larkin 2004, 2008) of the normative ways in which sound technologies and their uses have been portrayed, which neglect the 'many contexts in Africa, Latin America, and Asia where technologies are marked by interruption, obduracy, and failure', and where technological 'imperfection is a quotidian and normal part of life', with '*generative* as well as negative effects' (Steingo and Sykes 2019, 14–15). Steingo develops this conviction through his ethnography of Soweto, showing how core findings in audio technology studies that have erroneously been universalised play out very differently in the township, and dispelling any idea that media experience in Soweto represents an exception to global modernity (Steingo 2019, 52). His case is utterly convincing. Yet the MusDig studies suggest the need for a further correction: a rolling back, equally, of any tendency to equate the South unilaterally with Larkin's pirate infrastructures as they generate a 'sensorial experience of media marked by poor transmission, interference, and noise' (Larkin 2004, 291). To be sure, electronic music in Cuba exhibits a Larkinesque condition, plagued by scarcity and unstable infrastructures such that 'data moves more by foot than by fiber', and 'tools to make music are accessed exclusively *a pulmón* (literally "with one's lung" or, figuratively, with a lot of sacrifices)' (Boudreault-Fournier 2021, 137). But the situation in Kenya is different: 'the very first Kenyan releases to achieve significant airplay on Kenyan FM radio came out of [Nairobi recording] studios stocked with tens of thousands of dollars' worth of digital and analogue equipment, and were mastered and pressed on CD to international standards in Europe' (chapter 2 , pp. 51–2). What is needed, then, and Steingo concurs, is ethnographic vigilance to combat any 'empirical shortsightedness' (Steingo 2019, 53) towards the distinctive material and sensorial properties of sound practices in the South (and North). MusDig adds two further insights. First, rather than an opposition between globalised media *or* pirate bricolage, the MusDig studies testify to the ubiquity of technological hybrids – unpredictable mixtures of analogue and digital components and devices, of glossy high-tech and 'found', tarnished or 'failing' low-tech – characterising music scenes from Nairobi (chapter 2) to Montreal (chapter 7). And second, our work suggests that the 'meaning' of a given hybrid assemblage can't be inferred from its material components, for whether in Tejgadh (chapter

4) or Leicester (chapter 8), such hybrids bear witness to very different conditions while also participating in singular histories and ontologies.[14]

A second theme of *Remapping Sound Studies* concerns the ways in which, given its privileging of the North, sound studies 'has operated through a secular, social constructivist perspective that documents the historical growth of the ideological position it presumes' (2019, 209). In place of such teleologies, Sykes insists that 'non-Judeo-Christians have strategically appropriated, ignored, incorporated, or rejected the Western-derived secular notion' of sound, and that media technologies in such conditions are invariably 'used to enhance pre-existing sonic ontologies in which sound is connected to stars, gods, demons, malignant supernatural glances, and so on' (Sykes 2019, 208). Inveighing against the universalisation of secularism anatomised by Talal Asad, Saba Mahmood and others, Sykes argues that religion and the secular tend to be treated as mere 'auxiliary topics [or] subgenres of sound studies rather than understood as processes that generate(d) our very definitions of "sound," "the city," "self," and "technology" in the first place' (2019, 211). Sykes' critique is formidable and seeds fertile directions in sound studies. However, MusDig adds a coda: the need, in addition, to trace ethnographically the frictions between secularism and religion(s) and the complex politics thereto *within* our field locales and *among* Southern interlocutors – for the ontological fissures at stake run not only South–North but South–South. Deo's research in India touches on such fissures – between the secular-pluralist ontology of a Ford Foundation-funded national digital music archive and the radically different musico-social ontologies of the folk musicians being recorded and archived, such as those of the Gavda, 'Hindu communities that converted to Christianity, but partly reconverted to Hinduism in the early twentieth century' (chapter 4, p. 152). The point is larger, expanding decolonial critiques that focus only on power differentials and ontological violence between North and South; for Deo shows that such differentials exist also between religious and secular formations of the South, sometimes to drastic effect.[15] This points to the necessity of analysing social mediation: in Deo's study, to the ways in which gender, caste and class mediate Indian folk music digital archiving projects, and thereby extractive encounters between archiving professionals and folk musicians – that is, how social relations mediate sonic, religious, material and ontological differences.

A third encompassing theme of *Remapping Sound Studies* is articulated by Ana María Ochoa Gautier in her 'Afterword' and more fully developed elsewhere (Ochoa Gautier 2014, 2016). It amplifies Sykes' argument, aiming to transform the very relationship between

music/sound studies, ethnomusicology and anthropology. To do this Ochoa Gautier draws on an influential version of anthropology's 'ontological turn' associated with Eduardo Viveiros de Castro (Viveiros de Castro 1998, 2014). She charges the recent 'disciplinization' of sound studies with 'an epistemic tendency to universalize a particular experience [that of the North] as speaking for all' (Ochoa Gautier 2019, 261). In parallel, the canon erected by sound studies has ignored 'the prominent role of the anthropology of music … [and] sound in challenging such taken-for-granted notions as music, sound, and the relation between the human and nonhuman' (2019, 271). Consequently, she calls for future sound studies to alter 'the very grounding of the relation between nature and culture, between technique and technology, and between the human and the nonhuman required by the politics of life and death in the South' (2019, 270). Through a reading of Viveiros de Castro's concept of 'multinaturalism', Ochoa Gautier (2016) creates conceptual foundations for rebuilding sound studies as a rearticulation of music and anthropology through the idea of 'acoustic multinaturalism'. Steingo and Sykes concur: remapping sound studies means 'taking seriously the existence of multiple ontologies' as well as the 'ontological self-determination of the world's peoples' (Viveiros de Castro 2003, 18). This involves 'recognizing multiple *natures* rather than multiple cultures – multinaturalism … rather than multiculturalism' (Steingo and Sykes 2019, 18). For these writers, decolonising sound studies therefore entails a particular reconfiguration of music and anthropology by way of Viveiros de Castro's ontological anthropology, elevating 'the centrality of the conceptual in the work of the decolonial' (Ochoa Gautier 2019, 266). A core task is to attend to 'how key words in sound studies – "listening," "deafness," "silence," "noise," "sound technologies" … – emerge with different genealogies, embodiments, manifestations, and theorizations when thought from different experiences of the world in the South' (2019, 264).

This paradigm, a sonic-musical reinterpretation of what Eduardo Kohn identifies as a 'narrow' version of anthropology's ontological turn (Kohn 2015, 316), is undoubtedly powerful and persuasive. Yet it invites questions: does it deal more in metaphysics – in concepts or forms of thought – than ontology? Is it more concerned with language than what lies outside language, notably bodies, practices and materials, and the differences, resistances and torsions they throw up with respect to language (Born and Barry 2018, 465–7; Pinney 2005)? If Viveiros de Castro's 'ontological self-determination' is a political project, then why do accounts of its political implications not engage with such terms as 'serf, slave, caste, race, class, patriarchy, war, army, prison, police, government,

poverty, hunger, [or] inequality' (Graeber 2015, 32, n. 46)? And if 'anthropology is ontologically political inasmuch as its operation presupposes, and is an attempt experimentally to "do," difference as such' (Holbraad et al. 2014, 3, 6), then why is this political project routed through those Ur-anthropological subjects, indigenous Amerindians, as opposed to all the others who might be taken to be its enunciators? Indeed, inasmuch as Viveiros de Castro's project of suturing Deleuzean philosophy with Levi-Straussian structuralism recapitulates familiar 'archaic assumptions about the primitive', it risks restricting 'indigenous becoming to the order of myth' (Bessire and Bond 2014, 448).

The version of anthropology's ontological turn articulated by *Remapping Sound Studies* will undoubtedly continue to stimulate important research and incite impassioned debate. Does it represent the only critical anthropology of music/sound responsive to contemporary concerns, including decolonial critique and questions of ontology? The answer articulated in this book is that the encounter between music, anthropology, decoloniality and ontology – each a multiplicity – need not take this form and might take others. Kohn concludes of ontological anthropology that it 'is perhaps best realized … by a diverse and growing community of ontologically attuned ethnographic thinkers' (Kohn 2015, 323). By analogy, Marilyn Strathern observed in the 1980s about the complex articulation between feminism and anthropology that each has internal differences and 'together they do not form a whole' (Strathern 1988, 37). Moreover, 'much of the awkwardness in the relationship [between them lies] in the structure of their epistemological styles. It renders their relationship a hybrid' (1988, 37–8). In this spirit, the relational musicology of the MusDig project, when it seeks anthropological partnering, splices critical musicological currents together not with a 'narrow' ontological anthropology but with other approaches to deciphering music's ontologies (developed below) – but also with an alternative, 'ghost lineage' of critical anthropology, one articulated in the 1986 volume *Anthropology as Cultural Critique* (Marcus and Fischer 1999 [1986]).[16]

Anthropology as Cultural Critique (*ACC*) experimentally reimagined anthropology's future substance and 'transdisciplinary' relations (Marcus and Fischer 1999, xv). It heralded a 'repatriated' anthropology that would henceforth take the North as its object as much as the South. No longer 'is the project of anthropology the simple discovery of new worlds, and the translation of the exotic into the familiar, or the defamiliarisation of the exotic'. Instead, anthropology should 'study home societies with as much detail and rigor as comparative "other" societies' (Marcus and Fischer

1999, xvii–viii).[17] Traversing locales and scales, the new multisite ethnography would 'follow out and make explicit the numerous layers of mediation and incommensurability' (xviii) entailed by this project. The 'renewal of the critical function of anthropology as it is pursued in ethnographic projects at home' (Marcus and Fischer 1999, 112; cf. Jackson 1987; Nader 1972; Peirano 1998). would bridge anthropology and a host of other and earlier critical projects – from Marx, Nietzsche, Freud, Weber and the Frankfurt School to epistemological critique, deconstruction, feminism, media studies, cultural studies, critical legal studies and science studies.

ACC espoused two core ambitions. The first was to bring political economy within anthropology's orbit, with an attendant analytical imperative to cross scales (cf. Appadurai 2018). The challenge was 'how to represent the embedding of richly described local cultural worlds in larger … systems of political economy', a stance immediately qualified in several ways: by the observation that 'the "outside forces" in fact are an integral part of the construction and constitution of the "inside," the cultural unit itself' (Marcus and Fischer 1999, 77); by proposing that, rather than its traditional object, 'communities', anthropology could address '"the system" itself – the political and economic processes, spanning different locales, or even different continents' (1999, 91); and by portraying as a core problem how to 'mesh' political economic and interpretative anthropology (1999, 84–95), where work such as that of Nash (1979) and Taussig (1980) was considered exemplary. The second ambition followed, since this was to be a 'world *historical* political economy' (Marcus and Fischer 1999, 77, emphasis added): an anthropology that historicises the ethnographic present, addressing 'time and historic perspectives within an ethnographic frame' (Marcus and Fischer 1999, 98), whether by juxtaposing oral histories and archives, uncovering multiple versions of historical events, or historical reconstruction. Here Rosaldo (1980), Sahlins (1981) and Todorov (1984) were models.

ACC appeared influential in its time. Yet from the perspective of the present it is striking how diminished and codified its ramifying vision has become in the intervening years; hence labelling it a ghost lineage – for not all that the book 'protended' (Born 2015) has been actualised. Rather, its incipient programme came subsequently to be overshadowed by its influential twin volume, *Writing Culture* (Clifford and Marcus 1986). At the same time, topics identified in *ACC* as elements of a larger disciplinary reconstruction have been hived off, settling into comfortable academic existence as discrete (inter)disciplinary subfields, notably

anthropology-and-STS, the anthropology of intellectuals or experts, and anthropology-and-media studies, with digital anthropology its offshoot (Boyer 2008, 2015a). Arguably, the main intellectual successor to *ACC*, absent from that volume but present in *Writing Culture* through the intercession of Paul Rabinow, was Foucault. By the early 2000s Foucault's influence had become 'largely unparalleled in anthropology' (Boyer 2002, 265) and was foundational for the new growth areas of expertise and science.[18] Crucially, core proposals of *ACC* – notably repatriation and what it augured for a fundamental reconstruction of anthropology through critical ethnographies of the North, with the effect of both levelling the attention paid to the South and North and, inasmuch as North and South are historically interlocking, co-constitutive entities, bringing them into critical analytical relation, as well as research that conjoins culture and political economy – have receded, casualties of disciplinary re-entrenchment, fragmented into subfields around science and technology studies (STS), expertise and digital/media studies.[19]

In this light, the MusDig programme can be seen as revivifying *ACC*'s core proposals through music, while adding new concerns. MusDig proposes a critical anthropology of music encompassing North and South, one that conjoins ethnography and history, that crosses scales, and that brings matters of politics, economy, the social and cultural and their interleaving into the analytical frame. But it goes further, adding heft through music to such reformist projects as J. K. Gibson-Graham's theoretical move against an older style of political economy, a move that highlights the heterogeneity of 'local economic practices and organizations' and proposes that 'other economies are possible' (Gibson-Graham 1996, xiv, xi). The postlude to the volume develops these commitments more fully. If sound studies and ethnomusicology have now recognised the need for decolonisation, and for research on Western art music (Nooshin 2013),[20] then MusDig contends that these goals will not be met by ad hoc adjustments. They entail root-and-branch reshaping of disciplinary territories and intellectual divisions of labour, changes that implicate sound studies and ethnomusicology, to be sure, but also musicology, popular music studies and the broad lineage of critical, including post-Foucauldian, anthropology (Born 1987, 1995, 2000, 2010c). What is called for is a 'cumulative expansion of the conceptual and theoretical frameworks within which music scholarship proceeds' (Born 2010c, 210).

Music: mediation – assemblage – ontology

If MusDig inaugurates a new style of critical anthropology of music, it routes this through theories of music's mediation. Recently, Jonathan Sterne and Kyle Devine, leading writers on music and audio technologies, have conceptualised them through the idiom of mediality rather than mediation (Devine 2019; Sterne 2012). Mediality bears the imprint of Friedrich Kittler and media archaeology; it evokes '*a quality of or pertaining to media* and the complex ways in which communication technologies refer to one another in form or content', a 'general condition in which sonic practices take shape' (Sterne 2012, 9). The 'mediality of the medium' lies also 'in its articulation with particular practices, ways of doing things, institutions, and ... in some cases belief systems' (2012, 10). Mediality is preferred because mediation is taken to convey a situation 'where media follow one another in a march away from reality' (2012, 9); after Baudrillard, mediation might even imply 'the falseness of media' (2012, 251, n. 29). Mediality therefore does a lot of conceptual work – but it begins and ends with technological media. In their media-centrism, these writers join such theorists of mediation as Sarah Kember and Joanna Zylinska, for whom mediation is 'a key trope for understanding ... our being in, and becoming with, the technological world' (Kember and Zylinska 2012, xv), and John Guillory who, in his genealogy of the 'media concept', proposes that 'it is technical media that press upon us most urgently the need for a theoretical instauration ... of the media concept into a general theory of mediation' (Guillory 2010, 361).

The concept of mediation that has blossomed in the vicinity of music in the work of Tia DeNora, Antoine Hennion and myself differs from this approach. It enthusiastically embraces and tackles music's technological and material mediation, but does not privilege this. For DeNora, Hennion and myself, mediation refers to the two-way transmission, translation and transformation of one relatum (say, musical sound) by other relata (say, technologies, discourses, embodied practices, sites and social relations). Bruno Latour clarifies by drawing a distinction between intermediaries, 'what transports meaning or force without transformation', and mediators, which 'transform, translate, distort, and modify' what they are transmitting (Latour 2005, 39). Hence, a mediator 'creates what it translates as well as the entities between which it plays the mediating role' (Latour 1993, 78). DeNora develops the principle of the bidirectional, coproductive relations between musical object and subject, music and social life: 'just as music's meanings may be constructed in relation to

things outside it, so, too, things outside music may be constructed in relation to music' (DeNora 2000, 44). For Hennion, 'mediations are neither mere carriers of the work, nor substitutes that dissolve its reality; they are the [music] itself' (Hennion 2003, 84). My own contributions probe how music is 'multiply mediated', favouring 'associations or assemblages between musicians and instruments, composers and scores, listeners and sound systems – that is, between subjects and objects' (Born 2005, 7), and I add to this novel conceptual frameworks for analysing music's social and temporal mediations (Born 2011, 2012, 2015).

As later chapters make clear, then, in every locale, to understand the mutual mediation of music and digital media means reading out from the digital-musical object or event (MP3 file, track, album, performance, work, genre) to not only the material but the social, cultural, political, legal, ideological and aesthetic processes and relations in which it is entangled. To be sure, the MusDig research took as its problematic the relations between music and digital technologies in an era when music is subject to intensifying 'overlaps, continuations, and proliferations' of technological formats (Devine 2019, 34) and a 'splintering' of the digital music commodity (Morris 2015, 161–2). It nonetheless became very clear to the MusDig group that mediation could not be reduced conceptually to the effects of digital technologies. Rather than mediacentric, our approach takes its bearings unashamedly from music – while, paradoxically, the mediation framework enables our ethnographies to dissipate the very category 'music'. Such anti-essentialist strategies are now common in the music/sound disciplines (Sakakeeny 2015). Yet the terms of such anti-essentialism remain up for grabs, and one aim of the MusDig programme is to commend mediation as a powerful and *non*-mediacentric conceptual tool.[21]

In these terms, the main conceptual work done by mediation is to offer a way out of two linked reductionisms characteristic of earlier approaches to music research. The first is the essentialism, humanism and idealism imbuing musicological accounts centred on the autonomous work and composer. The second is the temptation to reduce music to being a reflection of 'extraneous' material, social or historical determinants – whether technological infrastructure, social structure, economic system or stylistic epoch. In response to the first reduction, DeNora, Hennion and I advocate an expansive *analytical* ontology of music (Born and Barry 2018, 478–9) centred on chronicling, in any empirical instance, how music is constituted by particular combinations of mediations, many of which will be present in some form: musical sounds (themselves composed of multiple human and nonhuman mediations [Born 2018,

193–6]) as they mediate and are mediated by embodied practices, instruments and technologies, certainly, but also aesthetic, critical and philosophical discourses, socialities, visual inscriptions, physical venues and virtual locations and so on. While some of these mediations will be focal for human actors, others will be backgrounded; some will be evanescent while others may recur or endure for years, decades or centuries. Analysing music in these terms involves charting which of these mediations is present in the experience of a musical object or event, and how they constellate to form a musical assemblage, producing experiential effects through their multiplicity, their simultaneity and their interrelations – without any assumption of organic totality. Critically, both the mediations and the nature of their interrelations can't be known in advance: they have to be traced empirically.[22]

In response to the second reduction, the approach to mediation advocated here moves beyond earlier forms of explanatory analysis centred on notions of reflection, homology or determination that have been common in art and music history but are now subject to incisive critique (Nagel and Wood 2010; Pinney 2005). The point is that multiplying what music is by identifying its constitutive mediations generates a more complex and distributed object – an assemblage – on which basis to trace the conditions and causalities bearing on it. At the same time, the mediations making up any musical assemblage direct us to be alert to contingency and non-linearity when probing why the assemblage takes the form that it does – and to do this through bidirectional analyses not only of what affects music but of how music itself influences historical processes (Born 2015). Such an approach is especially productive in moving beyond musicology's standard answer to explanation: analysing music in 'context'. As Ben Piekut puts it, the trouble with context 'is that it accepts and uses as explanations those stabilized contingencies that are themselves the formations that need to be explained' (Piekut 2014, 204–5).

If mediation enhances our conceptual tools for analysing music, the way it is often employed has limitations. Some existing approaches adopt a microsocial perspective, neglecting to interrogate the broader social processes in which music is entangled, and with this the analysis of power. They tend to neglect matters of temporality and historical process, continuity and change. Relatedly, the political implications of these analyses are underdeveloped. And while theorists of mediation have sometimes attended to aesthetic dimensions of music, this demands to be more developed, as does the analysis of aesthetic transformations – how, for example, musical practices both mediate and are mediated by the

dynamics of emerging and evolving genres (on this see chapters 2, 8 and 9). Moreover, these limitations tend also to be found in STS-influenced analyses of music/sound technologies. Together, these observations point to the need in research on music and digital technologies for the kinds of expansive empiricism amply demonstrated by the MusDig studies. In effect, the limitations listed here are variously and inventively tackled in the chapters that follow.

The most eloquent alternative to the mediacentric tendencies identified at the opening of this section is Richard Grusin's much-expanded conceptual account of mediation, which converges with the approach taken in the MusDig programme. Grusin takes his cue from William James' radical empiricism, arguing that 'mediation operates not just across communication, representation, or the arts, but is a fundamental process of human and nonhuman existence' (Grusin 2015, 125). For Grusin, mediation engenders immediate experiences: 'following James, I refuse to separate mediation from other experienced relations. Mediation does not … prevent immediate experience or relations, but rather transduces or generates immediate experiences and relations' (2015, 138). And he cites James in support: '*the relations that connect experiences must themselves be experienced relations, and any kind of relation experienced must be accounted as "real" as anything else in the system*' (James 1904, 534, italics in the original). Grusin therefore points via James to an understanding of mediation that includes but reaches far beyond technical media, where mediation can take the form of relation, process, entity and/or event, and where relations (mediations) are themselves both 'real' and 'real' components of experience. While I largely agree, I suggest that to Grusin's stress on immediacy must be added an equal concern for dimensions of mediation – notably, relations – that are not immediately or perceptibly 'present' but may be backgrounded, absented, occluded or denied, and that have to be inferred from immediate experience – while also exerting powerful influences on that experience. As Strathern comments regarding the epistemological basis of anthropology or any research method based on observation, especially when what is being researched, notably social relations, are not directly observable: 'Relation is in and of itself an abstract concept. It refers to a state of coexistence imagined as a link or tie, entities and entailments unspecified. It is not just that *social* relationships have to be inferred: *any* statement of relation proceeds by inference' (Strathern 2018, 171).

A last component of this approach takes further the concern with inferring and identifying mediations that are absented, occluded or denied. It links mediation to the conceptual challenge posed by the

existence of plural ontologies of music, raising the question of how mediation and ontology are articulated (Born 2013, 141–8). Analysing mediation proceeds, I have suggested, by teasing out from ethnographic material the salient mediations manifest in a given musical object or event as they compose a musical assemblage. In turn, identifying an ontology of music as it is lived by our ethnographic subjects proceeds not by attending to 'the centrality of the conceptual' (Ochoa Gautier) but by inferring through the evidence of discourse and practice how the various mediations are marked or valorised ontologically – as shown by their relative primacy, prominence or, on the contrary, insignificance or denial in the way the assemblage is enacted and experienced by those subjects (Born 2005, 2013). The method moves, then, from mediation to assemblage, and from there to the *actors'* ontology,[23] and the effect is to highlight the differences and any potential gap between the mediations composing a musical assemblage and how they are freighted ontologically by the actors. The aim is to become aware of particular ontologies of music not for relativistic purposes but, as arises in two chapters, to attest to when an ontology has become heightened or politicised among our interlocutors as a result of a challenge to or threatened erasure of that ontology (chapter 4), or because of change, including purposive, creative ontological transformations (chapter 8). To be sure, the MusDig approach differs from current proponents of ontological anthropology, for whom to 'present alternatives to declarations about what "is" … is itself a [radical] political act', one that proceeds by lending 'the "otherwise" full ontological weight so as to render it *viable as a real alternative'* (Holbraad et al. 2014, 3–4).[24] In this 'centripetal' politics, the 'ontologically-inclined anthropologist' (Fontein 2021, 10–11, 8) employs other ontologies as launchpads for the anthropologist's own conceptual experiments with what 'could be' (Holbraad et al. 2014). In contrast, the two later chapters pursue the quite different politics arising from dramatic if slow-motion historical clashes between contending ontologies of music, clashes suffused with differences of social and/or cultural power. At issue are our 'partial' attempts as analysts (Haraway 1988) to decipher the ontologies of our interlocutors as well as the 'local' politics of ontology in which they are enmeshed.[25]

Overviews of the chapters

In light of this broad framing of the MusDig programme, overviews of the chapters follow. It is crucial to stress that each ethnography takes its own

path through the methodological and conceptual themes presented thus far, extending, adapting or ignoring them as the researcher saw fit. Each chapter therefore has a singularity and a fullness, crafting its own analytical and theoretical coordinates. At the same time, those readers interested in the comparative conceptual and substantive findings generated across the chapters will find that the postlude to the book is devoted to drawing them out.

Chapter 2, Andrew J. Eisenberg's 'Soundtracks in the silicon savannah: digital production, aesthetic entrepreneurship and the new recording industry in Nairobi, Kenya', gives a vivid account of the emergence of a 'born-digital' popular music recording industry in Nairobi from the early 2000s. Eisenberg sets this within an analysis of the history of the Kenyan recording industry since the 1970s and a series of synergistic developments that fed the new industry: the arrival from the late 1990s in Nairobi's recording studios of high-quality digital music production technologies; the mobile telecommunication companies' rising investment in music as downloadable digital content for the burgeoning Kenyan mobile phone market; and the liberalisation of the mediascape following the ending of Kenya's state broadcasting monopoly, unleashing a huge demand for foreign as well as 'ethnic' popular musics.

Eisenberg draws out through three case studies and with reference to genre theory how Nairobi's new producers engage in risk-taking practices that are at once aesthetic, oriented to creating new music genres, and entrepreneurial in that each producer, by making new sounds, attempts to spawn new markets and sustainable business ventures. He traces how the 'urban' genres emanating from the digital music industry are understood in opposition to the vernacular genres that for many years were the mainstay of Nairobi's pirate recording industry and its lower class, older, rural audiences. Yet he shows too how new digital producers seek to 'vernacularise' their music, expanding their audiences beyond urban youth and constructing new audience coalitions across lines of age and ethnicity, city and village. The chapter charts the rise of three music production organisations – a commercial label, a non-profit label and a small production house – each a distinctive response to these conditions. In Eisenberg's reading, digital technologies had real causal weight in conjunction with other historical transformations in fuelling musical and social change in Kenya. The new cadre of producers were empowered to build creative organisations of varied scale and scope, fashioning stylistically-distinct music genres oriented to novel audience coalitions, and trialling new economic models. It is an optimistic portrait of the catalysis of a quite spectacular and multivalent take-off.

In contrast, chapter 3, Geoff Baker's '"In the waiting room": digitisation and post-neoliberalism in Buenos Aires' independent music sector', analyses the very different circumstances of Argentinian digital popular music. In the 2000s, after the arrival of digital production technologies, Buenos Aires became a Latin American hub for styles mixing local genres with electronic dance music (EDM). In parallel, the centre-left Kirchner governments (2003–15) advanced post-neoliberal policies espousing progressive visions of digital social justice and inclusion as alternatives to 'digital capitalism'. Against this background Baker charts the frantic efforts of a globally-renowned digital *cumbia* label, ZZK Records, to create a viable business using social media, blogs and SoundCloud to circulate music, videos and publicity to its transnational fan base. Yet, symptomatic of the wider state of independent music in Argentina, ZZK's activities failed to create a sustainable economy and the label was perennially in crisis, its musicians forced to cross-subsidise their music-making with other work. Within a few years ZZK's artists were espousing a 'post-digital' discourse embracing critical reflection on digital technologies, a quasi-ethnomusicological interest in Latin American folk musics, and recognition of the economic potential of live, non-laptop-based performance. Baker compares ZZK's fate with two variant digital *cumbias*: the commercially successful, working class-oriented *música turra*, and an anti-capitalist version circulating on 'netlabels' – unveiling a spectrum of ideologies and social, economic and organisational forms mediating this heterogeneous genre.

Widening his lens, Baker sets digital *cumbia* within a revelatory analysis of Argentina's digital cultural policy landscape from the mid-2000s. He shows that the independent music sector and fledgling attempts to create Argentinian versions of services like Spotify were handicapped in digital conditions by the powerful, 'close and collusive bloc' formed against them by older institutions: multinational record companies, mainstream media, and the national collecting and trade societies – a bloc that continued to favour the multinationals, obstructing emergent actors' attempts to build a digital music economy. Scaling out further, Baker outlines contending ideological programmes for digital culture articulated from the early 2010s at two levels of government. Buenos Aires' right-wing municipal government emulated trends in the North, espousing neoliberal creative industries policies modelled in part on New Labour in the UK. In contrast, the centre-left Ministry of Culture drew inspiration from Brazil's then redistributive and egalitarian policies, proposing a progressive matrix of digital cultural industries

initiatives. Both programmes met resistance from the old institutional bloc, and most initiatives ended under the right-wing Macri presidency from 2015.

In chapter 4, 'Oral traditions in the aural public sphere', Aditi Deo offers quite different perspectives on music and digitisation in the South. She charts diverse projects in North India stimulated by a discourse of 'digital heritage' engaged in the digital archiving of folk musics, amplifying Ochoa Gautier's (2006) resonant concept of the aural public sphere. Deo suggests, like Eisenberg, that the increasing availability of digital technologies was causal in stimulating these projects; equally important was funding by transnational development agencies like the Ford Foundation. Deo's ethnography centres on three digital archives, comparing their technological ecologies, ideological, political and religious affiliations, and social and organisational forms. The first, the Archives and Research Centre for Ethnomusicology (ARCE), is the subcontinent's leading academic centre for digital archiving. Deo examines a major ARCE project, the Archives and Community Partnership (ACP), funded under the Ford Foundation's 'pluralism' programme, which implemented UNESCO's 2003 policy in which intangible cultural heritage was redefined as inhering in communities of practice as opposed to abstracted cultural artefacts. Working with communities in Rajasthan and Goa, the ACP sought to foster community-led archiving. Whereas Manganiar and Langha musicians in Rajasthan had long been invested in the musical and social transformations wrought by recording and archiving, among Goan Gavda communities the ACP met resistance, failing to transform the Gavda musico-social ontology in which music is deeply embedded in ritual practices. Ironically, the fractious relations between the ACP and partner communities, Deo notes, 'reproduced, at least partially, the very hierarchies of social and cultural power [the ACP] was charged with mitigating' (p. 152).

A second archiving project in Bikaner, Rajasthan, also funded by Ford, involved a collaboration between Bangalore's Kabir Project and Lokayan, a local cultural organisation. The project turned on social differences of caste, class and gender: between the archivists, metropolitan intellectuals and local high-caste male activists, and the low-caste, elderly female hereditary folk singers they were recording. Tensions grew around interpretations of Kabir, a fifteenth-century saint whose poetry formed the core of the singers' repertoire. While locally, among low-caste adherents, Kabir's poetry was an affective symbol of resistance to caste-based oppressions, the archivists reinterpreted it to be emblematic of a secular nationalist politics. Deo contrasts these initiatives with a third, the

Vaacha ('Voice') museum-archive, part of the Adivasi Academy in Gujarat. Here, digital archiving of folk musics is intimately tied to a social movement among indigenous ('tribal') groups to advance their self-determination and rights. Against colonial ethnography, Vaacha translates curatorial knowledge and technical skill into participatory, self-representational alternatives. Comparing the three initiatives, Deo observes that the outcome of digital archiving depends 'on how local ontologies of music, as well as the social relations within which music is locally embedded, meet the imperatives bound up in archiving as a now-paradigmatic' practice (p. 155). Her Bikaner study corrects the neglect of 'caste as a valid analytical framework' (Ajotikar 2019, 135), highlighting the expropriation of Dalit women's sounds and knowledge. The chapter attests to negotiation and conflict between hegemonic and subjugated knowledges (Foucault 2003), and to a stratification of technological ecologies. If the ACP and Lokayan-Kabir Project make plain how digital archiving can reproduce or amplify social inequalities, Vaacha shows how it can also be enrolled in social movements to transform them.

Chapters 5 and 6 open a new seam, moving ethnographically 'inside' digital music technologies and platforms. Both studies cross scales, reading out from these assemblages to the political-economic and historical formations by which they are shaped. In 'Online music consumption and the formalisation of informality', Blake Durham and I pursue the digital music archive online. We compare two 'North'-based services for the circulation and consumption of music: the commercial streaming platform Spotify, and an extralegal peer-to-peer (P2P) file-sharing site, Jekyll, supporting a vast participant-assembled archive of music in high-quality digital formats. The chapter takes initial bearings from debates over file-sharing as 'gift' exchange, arguing that in both platforms exchange depends on certain kinds of participatory labour that animate characteristic forms of sociality. A key focus is the technical architecture of both platforms, assemblages in which the material, musical, ideological and social are intertwined. Drawing on STS, we analyse how these technical designs shape circulation and consumption, pointing to the distinctive forms of governmentality manifest in each (Foucault 2007).

In contrast to idealisations of P2P cultures, Durham anatomises the elaborate rule-bound socialities of Jekyll's audiophilic subculture: its hierarchical 'user class system', its fetishistic policing of audio quality, and the 'ratio system' which governs reciprocity in music exchange by enforcing normative ratios of downloading to uploading. Indeed, Durham contends, Jekyll's ratio system enacts 'a pseudo-commodification of the

torrent economy' in that music files amount to 'interchangeable and alienable commodities whose "cost" is directly correlated with the size of the digital file'. Updating anthropological exchange theory by bringing it online, we contend that participants' lively practical and emotional investments in the socialities of online exchange suggest these socialities 'may be as existentially central to both the experience of and the value derived from such exchange systems for participants as are the objects – here, music – possession of which is putatively the driving motive for exchange' (p. 185). Probing in turn how Spotify mimics the 'informality' of P2P systems through its elicitation of users' labour and simulations of 'community', Durham charts the path-dependent interplay in the development of the two systems. Yet ultimately, Spotify's 'highly individualised, rentier-based design' occludes the P2P reciprocities enlivened by Jekyll and its like. Scaling up, we conclude by dissecting two interlaced tendencies: the platforms' distinctive contributions to 'circulation-based capitalism' (Lee and LiPuma 2002), and the rentier musical capitalism pioneered by Spotify, where algorithms designed by the science of Music Information Retrieval govern not only the extraction of valuable personal data but the recursive intensification of consumption.

Chapter 6, 'Max, music software and the mutual mediation of aesthetics and digital technologies', by Joe Snape and myself, develops an analysis of the global music programming environment Max, used by musicians and taught in higher education settings around the world. Through an analysis of Max's complex materiality, the chapter probes the interplay between technics and aesthetics. Snape did fieldwork in several sites, notably the Center for New Music and Audio Technologies (CNMAT), University of California, Berkeley, and the company Cycling '74, then Max's developer. Citing Donna Haraway's plea for 'politics and epistemologies of location, positioning, and situating' (Haraway 1988, 589), we observe that the *aesthetic* situatedness – the particular musical histories and cultures – subtending the use of technologies like Max is often absent from STS-inflected accounts of music technologies. In turn, we note, efforts to theorise the aesthetic in digital music and digital media studies only pose more questions: 'where is the aesthetic located – in the medium, format, hardware, software, interface, or reflexive medial gesture? Or in the combination of some or all of these?' (p. 226).

The chapter proceeds archaeologically, excavating the internal operations of a Max patch built by the musician Mark Fell, and then scaling up. Zooming in on the materiality of the patch, Snape addresses core themes of STS: the nature of agency and its distribution among human and nonhuman actants. He identifies a number of idioms,

situations and scales of Max use: from the improvisational 'hack and flow' practices of a skilled Max programmer; through three pervasive techniques in which Max's construction of time – very different to that of DAWs – is central; to the expanded aesthetic assemblage of a live Holly Herndon performance. Woven through the chapter is an analysis of Max's social mediation, evident in a 'high–low' metapositioning in which Max, identified as research-oriented and experimental, was for decades defined by proponents in opposition to commercial DAWs like Ableton Live. Yet in recent years this positioning has changed as Cycling '74 and Ableton forged a technical-and-institutional convergence, first by developing Max for Live, rendering Max a 'plug-in' within Ableton Live, and then in 2017 by a company merger – both moves 'defensive innovations' with arguably 'anti-inventive' effects (Barry 2007, 297–301). We compare the Cycling–Ableton tie-in with CNMAT's research on Max externals, gifted to Cycling and designed to create 'ways of working … fluently with multiple, diverse music platforms' (p. 256). At base, the chapter pinpoints an asymmetry in Max's institutional ecology in which value flows 'from CNMAT to Cycling, from Cycling to Ableton – from public university to private company, company to corporation' (p. 257). Crossing scales, our analysis sutures the 'yawning gap between revisions of Max's codebase … and movements in its political economy' (p. 259) as they relate, in turn, to aesthetic possibilities.

Chapter 7, Patrick Valiquet's 'Remediating modernism: on the digital ends of Montreal's electroacoustic tradition', propels the volume in a new direction: towards the labile condition of digital art music in the global North. Within a rich analysis of the Canadian city's cultural politics, the chapter probes the challenges ostensibly posed by the digital to the hegemony of Montreal's academic acousmatic music tradition.[26] Valiquet highlights Montreal as a beacon of cultural production in post-industrial North America, known from the 1960s for the ways in which urban redevelopment, economic renewal and tourism were yoked to high-tech modernist projects in architecture and the arts, but also for hosting lively media arts scenes and software industries. Given Quebec's modernising nationalist aspirations, 'harnessing technological progress for the public good' (p. 277) has been a core component of nation-building. From the 1990s the digital came to be elevated as a new 'media ideology' (Gershon 2010), and by 2011 Quebec's arts council was espousing 'digital arts' programmes. At the heart of a consultation on these programmes between cultural officials and their artist publics, Valiquet shows, were intensely politicised differences over the very definition of the 'digital'. Yet the visions of digital arts being aired sought unanimously to move beyond

acousmatic modernism – believed to be in decline as digital technologies augured change towards a 'flat, postmodern utopia' (p. 272).

To illuminate the halting supersession of acousmatic modernism, Valiquet gives ethnographic portraits of key cultural-political and aesthetic developments. They highlight a characteristic of Montreal: how music and the arts have provided grounds in recent decades for the growth of diverse institutional forms. Hence, by the mid-1990s 'a strong enough network of media production companies, software startups, artist-run centres, unlicensed loft venues and nightclubs' existed to threaten the pre-eminence of the academic music studios (p. 269). The composer Alain Thibault, the focus of one portrait, was educated in Quebec's acousmatic studios but became a heretic, drawing on electronic dance music and creating an alternative power base as director of the Elektra festival. However, local musicians perceived disparities between Thibault's rhetoric and his modernist programming, which ignored the 'contentious plurality of local aesthetic traditions' (p. 282). Valiquet's sketch of composer Jean Piché is another narrative of dissent and recoil, with origins in a Montreal electroacoustic training followed by interludes in acoustic ecology and commercial music. Yet Piché's pluralism moderated on re-entering academia as he re-embraced modernist complexity. A final portrait, of composer Freida Abtan, foregrounds the gender inequalities and raced exclusions underpinning academic electroacoustics, the stimulus for a politics among Abtan and other younger artists. Valiquet conveys how these politics mediated a concert organised by Abtan to foster a 'coalescence' between starkly divergent scenes. He concludes that while Montreal's electroacoustic aesthetics were diversified by Thibault, Piché, Abtan and others, a diversification often attributed to the 'digital', these changes did not destabilise the structures of cultural power, which continued to uphold a 'modernist ethos of cultural distinction' (p. 298).

My chapter, 'The dynamics of pluralism in contemporary digital art music', complements Valiquet's. Based on fieldwork in Britain's leading academic electroacoustic music centres in Belfast, Leicester and Huddersfield along with their national and international networks, it too probes the waning hegemony of academic acousmatic music, but attends more to exit routes: the burgeoning of an array of new idioms. My ethnography focuses on younger generations of musicians and composers taking PhD, masters and undergraduate programmes in music technology and sonic arts, portraying the rapid expansion of these degrees since 2000 as both a barometer and a catalyst of wider musical, cultural, social and political changes (Born and Devine 2015), and exploring how the

younger generations see the musical present. In contrast to Montreal, where nonacademic noise and sound art scenes appear to proliferate as countercultures outside academia, in the UK similar currents were making halting inroads inside the universities, transforming the educational culture. Three themes run through the chapter: first, the emergence of a spate of practices challenging prevailing classificatory boundaries – between music and sound, art and popular music, academic and nonacademic music, digital and post-digital practices. Second, how these changes put pressure on established understandings of what music is through rising interdisciplinary practices embodying a 'logic of ontology' (Barry and Born 2013). And third, how my interlocutors were 'making time' through practices engaged at once in producing musical past, present and future.

The first half of the chapter gives a genealogy of this situation, depicting three broad constellations of change that together illuminate the rise of music technology degrees. As well as the growth of affordable digital music technologies and internet access, the changes include a range of neoliberal university reforms, the advent of creative industries policies, a re-engineering of the arts and humanities as incubators of entrepreneurial values, and the ascent of practice-based research. With the third constellation I draw attention to a spate of aesthetic trajectories gleaned from my interlocutors that together add up to a strenuous reshaping of post World War II music history – multiple new pasts feeding an efflorescence of novel aesthetic, technological and material imaginaries. Zooming in, I trace these developments inside a music-tech degree, narrating a student experience, curricula, a textbook, and history and composition classes. In this light I analyse the music and sound art arising from these conditions in the guise of my interlocutors' heterogeneous practices – an array of experiments that problematise the ontology of acousmatic music by staging alternative ontologies of music. The chapter ends by probing paradoxes of pluralism: how the extension of the music-educational franchise fuels a massification of the avant-garde; how the creative practices described exhibit 'minor variation' yet claim to be *sui generis*; and how the insistent coining of new pasts can effect a waning of historicity.

Finally, chapter 9, 'Music and intermediality after the internet: aesthetics, materialities and social forms', by Christopher Haworth and myself, pursues more spectacularly through online practices this volume's concern with our interlocutors' reflexive creative interventions in time and history. To research how the internet as a creative medium is changing the way music is made and experienced, we analyse the online lives of five

internet-mediated genres that arose from the late 1990s on: microsound, hauntology, hypnagogic pop (h-pop), chillwave and vaporwave – underground genres that baffle any boundary between art and pop. Haworth innovates by hybridising a digital sociology tool, Issue Crawler (IC), with ethnographic and historical methods, showing how each assemblage exemplifies a particular moment in the evolving technics and cultures of internet use. The first half scrutinises IC visualisations of each genre's hyperlink ecology, identifying characteristic actors, practices and forms of mediation. The results convey how the internet multiplies, intensifies and remixes music's mediatic, discursive and social mediations. Intermediality, it emerges, *is* music's online condition. The ethnography reveals not only how each genre creates a singular mode of intermediality, but how the materialities and socialities in play are replete with knowing social, political and cultural-historical connotations. H-pop, for example, combined 'a devotion to the immersive qualities of YouTube with a politics attached to the severely restricted modes of exchange characteristic of the DIY practices of the 1980s' (p. 394).

On the basis of these findings, the second half of the chapter reconceptualises the aesthetic in relation to the five genres to incorporate the material and social. We point to online labels as formative actors engaged in aesthetic mediation, and to how in an era of proliferating formats their curatorial practices cultivate an aesthetics of the format (cf. Sterne 2012, 149). Analysing albums made for charismatic labels by musicians Mark Fell and Keith Fullerton Whitman, we show how, through their 'mutual prehensions' (Whitehead 1978 [1929]), artists and labels together hone distinctive aesthetic personae. If the aesthetic experience of h-pop and vaporwave depends on 'relations set up between and across different media and formats' (p. 414), this is best conceived, we suggest, as *intermedial intertextuality* – a pervasive intertextuality of media. For central to the aesthetic experience of the genres are the ways in which old and new media/platforms/formats participate in the assemblage not as tabula rasa but (again) drenched in cultural-historical associations ripe to be ironised, parodied or *détourned*. To end the chapter, we set the ethnography in dialogue with two media theories, media archaeology and cultural techniques. For all their strengths, we contend, in different ways these theories fail to account for the richly reflexive relationships to media/platforms/formats central to these genres, and how it is their cultural-historical connotations that power their creative return. We counterpose these theories with an art-historical reading of the emergence of video art, arguing that the latter, which takes account of social and cultural as well as material histories, registers the intensely reflexive

human engagements with media and media histories permeating our ethnography – and thereby yields a better materialist theorisation of media change, and of history.

For all the piercing originality of the individual studies conveyed in these chapters, and the subtle ethnographic sensibilities evident in each, at the heart of the MusDig project was our attempt to do more: to work with our research collaboratively and comparatively. This post-fieldwork, collaborative and comparative phase of the group's work may not be signalled overtly in the chapters that follow, but to varying extents it informed their writing. The fruits of that phase are presented in the book's postlude.

Notes

1 I use the terms global South and North as heuristic reifications that open up certain productive vectors of comparison. I follow Yael Navaro (2017, 210) when she observes that 'we can no longer classify anything as exclusively non-Western (taking colonialism and its enduring aftermath into account)', so that she is interested in tracing 'other geographies and historical conjunctures that I will only heuristically call non-Western' – in my terms, the global South.

2 See the acknowledgements, note 1, p. xvi, for information about the funding of the MusDig research programme.

3 See the postlude to this book for a fuller discussion of this comparative analysis.

4 The ethnographic present for the chapters varies: the fieldwork for chapters 2, 3, 4 and 7 occurred between 2011 and 2013; for chapters 5, 6, 8 and 9 it took place between 2013 and 2018. The lengthy time absorbed by the book's preparation means that many URLs and webpages referenced in chapters are inevitably no longer live, have changed or disappeared. This speaks to the transient condition of the web and the internet and the serious methodological challenges posed by these realities to digital anthropologists and internet historians – and, generally, to scholarly practice (Milligan 2019, chapter 2).

5 Additional publications by members of the MusDig research group can be found in the reference sections for this introduction and the other chapters.

6 There is a lively literature on this matter in the humanities and social sciences; influential discussions are Galison (2004) and especially Berlant (2007), who remarks percipiently on 'the prevalence of case-study narrativity in scholarship, which mobilises a whole variety of descriptive and interpretive processes of determining likeness, generality, or patterning and whose interest in typification often (incoherently) produces evidences of singularity as the optimistic moment of excess or surplus to its very analytic activity' (663, fn. 1).

7 The ERC's architecture as a response-led international funding body followed the vision of its first President, Helga Nowotny, a sociologist of science who co-initiated a debate on the productivity of transdisciplinary research and ensured the ERC embodied these policies (Gibbons and Nowotny 2001; Nowotny et al. 2001).

8 The research by Boudreault-Fournier is not represented in this volume, but see Boudreault-Fournier and Blais (2015, 2016); Boudreault-Fournier (2017, 2021). Collaboration between Kyle Devine and myself generated publications that are also not represented here; see Born and Devine (2015). After MusDig, Boudreault-Fournier and Devine themselves collaborated on a major project: see Devine and Boudreault-Fournier (2021).

9 'Jekyll' is a pseudonym.

10 This framework was first employed in Born (1995) and further developed in Born and Hesmondhalgh (2000). It differs from Nicholas Cook's (2012) idea of a relational musicology.

11 This design philosophy is different, for example, to the comparative anthropology developed by Daniel Miller and his collaborators on the basis of their ethnographic research on social media (Miller et al. 2019).

12 This is a core comparative theme elaborated in the postlude.
13 As it has been in the work of others, for example Feld and Brenneis (2004), Samuels et al. (2010).
14 These arguments are developed in the postlude to this book.
15 And given the long histories and complex cartographies of migration, such a stance is relevant also to particular forms of 'South-South' clash or friction that play out *within* the global North.
16 In paleontology, a 'ghost lineage' is a line of descent inferred to exist despite lack of evidence in the fossil record (Wedel 2010), a 'deep structure of phylogenetic hypotheses' (Norell 1993, 410). A subset of ghost lineages reappear after a long period of apparent extinction: they are called 'Lazarus taxa'.
17 My early work (Born 1989, Born 1995) took a similar direction quite independently of the American currents.
18 A key text attesting to these disciplinary shifts, including Foucault's influence, was Ong and Collier (2005).
19 But see Candea (2011) for a hint of rediscovery of these issues in critical dialogue with Viveiros de Castro.
20 My book *Rationalizing Culture* (1995) effectively inaugurated the anthropology of Western art music.
21 On the theory of mediation employed in the MusDig programme, and how it departs from actor network theory, see Born and Barry (2018).
22 On the analysis of music's mediations and how they form an assemblage, with reference to DeLanda (2006) and Deleuze's theory of assemblage (Deleuze 1987, 1988), see Born (2011, 2012).
23 A core aim of this method is to avoid any tendency to confuse the *analyst's* ontology with the ontology of the *actors* that are the focus of research: for this risks projecting 'an analytical ontology that occludes the ontologies of those we study' (Born 2010c, 232), thereby 'misidentifying their ontologies' (Born and Barry 2018: 478).
24 The authors source the 'otherwise' from Povinelli (2012) when she asks: 'why does this person strive to remain otherwise – to speak truth at the threshold of being?' (2012, 471). Povinelli answers by describing the 'otherwise' as 'an experiment in and against power, a method of trying things out' via 'an experiment on the self in the world' (Povinelli 2012, 472), one that 'depends on a certain sort of person who is either ethically otherwise... [or] seeks to be ethically otherwise' (Povinelli 2012, 455). Her formulation offers a curiously individuated and involuted approach to the 'political potentiality' (Povinelli 2012, 462) of the 'otherwise', one that appears to be detached from any wider, worldly political referents.
25 In writing of a politics of ontology, it might be imagined that I refer to Annemarie Mol's concept of ontological politics (Mol 1999, 2002). But our research suggests a different approach. We are concerned with diverse types and degrees of politicisation arising from the power-imbued ontological clashes mentioned (see chapters 4 and 8). Mol's concept does not attempt to capture the particular politics of ontology that arise in such situations; indeed it is not intended to address politics as conventionally understood at all.
26 Acousmatic music is an important modernist genre of electroacoustic art music descended from the work of Pierre Schaeffer in the radio studios of RTF, Paris. It is 'intended for loudspeaker listening and exists only in recorded form (tape, compact disc, computer storage) … [and] the listener perceives the music without seeing the sources or causes of the sounds'. The genre explores the 'allusive play of causalities, metamorphoses, acoustic imagery and the behaviour of sounds in virtual spaces', with particular focus on 'the finer details of sound quality' (Emmerson and Smalley 2001).

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2

Soundtracks in the silicon savannah: digital production, aesthetic entrepreneurship and the new recording industry in Nairobi, Kenya

Andrew J. Eisenberg

A young man stands at the head of a conference table, speaking confidently to an audience of older businesspeople. A black-on-black suit hugs his wiry frame, and thin locks lay tightly against his head. We don't hear what he is saying, but his powerful voice forms part of the sonic backdrop to the scene, spitting Swahili and English words over a groove made up of a throbbing synth bass and a driving backbeat. He sets his tablet computer carefully upon the conference table, presses a button on its frame, and stands back. A three-dimensional digital projection rises from the screen, showing a rotating schematic for a building vaguely reminiscent of Dubai's Burj Al Arab. Applause and nods of approval come from around the table, all in dramatic slow motion.

Jump cut. The young man stands alone in front of an LED board displaying stock prices and the logo of the Nairobi Stock Exchange. Reunited with his voice, he raps to the empty room. Sunglasses hide his eyes. For a moment, he looms over us like an angel, his body lit by lens flares.

Jump cut. The young man stands before a massive concrete overpass in the midst of an otherwise barren landscape. His suit has been replaced by fashionably faded jeans and a tee shirt emblazoned with a colourful logo. Now he is rapping directly to us:

Wanadrown kwa machozi zao	(They drown in their tears)
Tunaogelea kwa jasho zetu	(We swim in our sweat)
Who's laughing now?	
Exponential Potential!	

These are scenes from the video for Kenyan Christian rapper Juliani's 'Exponential Potential', a Sheng (Swahili-English slang) rap track set in a style that mixes elements of rock and electronic dance music (Juliani 2011).[1] In its robust (Afro-)optimism, its celebration of hard work and entrepreneurial risk-taking, and its emphasis on the role of digital technology in auguring the future, this cultural text beautifully encapsulates the context in which it was produced: the new popular music-recording industry that has emerged in the Kenyan capital Nairobi in the wake of the liberalisation of the national media and the introduction of digital music technologies. I call this industry 'new' because it was born digital and emerged separately from an already-existing recording industry centred in Nairobi's old business district in and around downtown–River Road. It also bears a quality of newness by virtue of being a space of constant experimentation. Stubbornly resistant to standard business models, its agents have monetised (or failed to monetise) the popularity of songs and artists through a variety of means calibrated to changing media infrastructures and intellectual property regimes. The aim of this chapter is to develop an empirically grounded perspective on how the business of musical production works – how organisations involved in the creative work of making music arise and thrive – in this highly improvisational context. In so doing, the chapter also then aims to address some broader questions about the intersections of music, digital technology and capitalism that link the concerns of the Music, Digitisation, Mediation research project to those of researchers and policymakers working to grasp the dynamics of cultural industries in developing economies (Barrowclough and Kozul-Wright 2008; Caves 2002; De Beukelaer 2015).

My core argument in this chapter is that Nairobi's new recording industry has taken shape in large part through individual projects that are at once wholly musical and wholly entrepreneurial, involving moves and strategies in musical form geared as much toward generating new business models and organisations as they are toward particular aesthetic aims. I use the term *aesthetic entrepreneurship* to describe these sorts of projects. Notwithstanding the emergence of artists like Juliani, who have embraced an 'aesthetic of the entrepreneur' (Shipley 2009) and developed

novel modes of entrepreneurship, aesthetic entrepreneurship in Nairobi's new recording industry has primarily been the domain of producers. Following an overview of the new recording industry, I present three case studies of new-industry producers who have employed digital music technologies to simultaneously enact a new aesthetic formation (that is, a new style, genre or 'sound') along with a new organisation. All of the studies are based on ethnographic interviews and participant-observation carried out between July 2011 and August 2012.

The music producers profiled in this chapter form a diverse group with respect to their personal and educational backgrounds, musical abilities, aesthetic orientations, and social and professional networks. It is only in gender identity that they form a homogeneous group: all are men, as are the vast majority of producers in Nairobi in both the old and new recording industries.[2] Their respective organisations are similarly diverse: one is a label and production house, one a production house without an associated label, and one a non-profit organisation involved in musical production and research. Across the studies, however, the same two factors serve to articulate the aesthetic to the entrepreneurial. The first is digital technology. The advent of digital music technologies – specifically, the MIDI sequencer and digital audio workstation (DAW) – was key to the emergence of the new recording industry, and the reliance on these technologies and their associated techniques remains one of its defining characteristics. While I take Jonathan Sterne's (2006) point that attributing too much to the digital potentially obscures other social and aesthetic factors in analyses of cultural production, it is clear that digital music technologies have shaped the business and craft of popular music production in Nairobi in powerful ways. The case studies in this chapter suggest that one of the most important ramifications of digital music technologies for the business of popular music production in Kenya is how they concentrate creative control in individual actors. As we will see, some of the key agents of Nairobi's new recording industry have been aesthetic entrepreneurs who, under an earlier technological regime, would have had to cede more creative control to other agents, and in some cases might not have become involved in creating music at all.

The second factor that draws together the aesthetic and the entrepreneurial in the work of all three producers profiled here is *genre*. The aesthetic practices that underlie the birth and development of a music genre are already 'entrepreneurial' in a general sense. Building on David Brackett's (2005) discussion of the 'addressivity' of musical genre in the African American context, Georgina Born offers a model of musical genre as a highly contingent process of fostering 'affective alliances' by

‘projecting’ sounds that resonate with emergent ‘musical and social identity formations’ (Born 2011, 384; Born 2012; cf. Brackett 2016, 20). Thus described, genre in music involves practices of risk-taking and opportunity-seeking that are fundamentally entrepreneurial in nature. In particular, given its emphasis on the ‘production of teleology’ (Born 2011, 384), Born’s genre theory resonates with the social constructionist approach to entrepreneurship, which emphasises the ‘creation’ or ‘enactment’ of opportunities that in retrospect may seem to have been ‘discovered’ (Baker and Nelson 2005; Chell 2000; Fletcher 2006; Gaddefors and Anderson 2009; Korsgaard 2011; Sarasvathy 2001; Sarasvathy 2008; Wood and McKinley 2010).[3] What I want to suggest in this chapter is that the aesthetic work of creating or transforming a music genre may at times cross from being simply *entrepreneurial* in the general sense of the word to being *entrepreneurship* in the specific sense of exploiting a market imbalance to establish a new business venture. The case studies describe how three producers in Nairobi’s new recording industry engaged in aesthetic work as a means of building an organisation oriented toward addressing perceived market imbalances.

Aesthetic entrepreneurs ground their projects in hypotheses about imbalances that obtain between available cultural products and existing taste formations. Despite their differences, the producers profiled here all grounded their projects in the same hypothesis: that the products of the new recording industry at the respective moments in which they were working lacked an essential connection to local aesthetic sensibilities that could be found in so-called ‘vernacular’ popular music.[4] Understanding how this perspective came to be shared among a diverse group of producers in Nairobi’s new recording industry is one of the tasks of the next section of this chapter.

Nairobi’s new recording industry

Nairobi emerged as regional hub for popular music production after World War II. By the late 1970s, the city boasted a large community of talented musicians from across the region, and a range of recording studios and related facilities (including a large record-pressing plant) operated by a mix of multinational corporations and local actors (Odidi 2015; Wallis and Malm 1984, 92–6). All that changed in the early 1980s, however, as a combination of cassette piracy and a general economic downturn pushed commercial music recording in Nairobi into a severe slump that lasted for the next decade (Nyairo 2004, 11–13; Stapleton and

May 1987, 272). The sole bright spot for commercial music recording in Nairobi during the 1980s and early 1990s was the relatively self-contained recording industry in the downtown–River Road district – referred to metonymically as 'River Road' – which, as is still the case today, was focusing on 'vernacular' popular music genres sung in Kenyan languages other than the regional *lingua franca* Swahili. River Road benefitted from the loyalty of vernacular music audiences, whose propensity for purchasing recordings was only intensified by the *de facto* ban on vernacular music on Kenya's state-controlled airwaves during the height of Daniel arap Moi's authoritarian reign, in the late 1980s and early 1990s (Ngujiri 1997); and a working system of phonogram distribution that could outcompete unlicensed distribution (i.e. 'piracy') through sheer speed and efficiency.

A revival of popular music recording in Nairobi outside of River Road finally arrived at the turn of the millennium, in the form of what Joyce Nyairo (2004, 14–21) aptly terms Kenya's 'millennium music boom'. Nairobi was suddenly putting out new, regionally popular sounds again, this time cosmopolitan, youth-oriented music genres sung primarily in Swahili and Nairobi's Swahili-based youth argot Sheng. Typically glossed as 'urban music' in Kenya today, these genres creatively adapt elements of North American, Caribbean and African popular musics, especially hip hop, contemporary R&B, Jamaican ragga/dancehall, rock and Congolese *soukous*.

Much of the groundwork for Kenya's millennium music boom was laid by the global digital revolution, which had introduced new technologies for music production as well as new possibilities for reviving local distribution of recorded music. Despite a great deal of hope invested in the advent of the compact disc format (Nyairo 2004, 15), a true revolution in phonogram distribution in Kenya did not actually occur until mobile telecommunications companies got heavily involved in music after 2005 (De Beukelaer and Eisenberg 2018; Eisenberg 2012). A revolution in music production arrived much sooner, however. By the mid-1990s, a number of recording studios in Nairobi were equipped with keyboard workstations with digital (MIDI) sequencers, and a few had high-end computer-based set-ups. By the early 2000s, nearly every recording studio in Nairobi was built around a computer-based digital audio workstation (DAW) – with the key exception of the major studios in downtown–River Road, which continued to use analogue equipment acquired in the 1980s from the departing multinationals.

Just as digital music technologies were sparking new forms of musical creativity in Nairobi, a massive change to Kenya's urban

mediascape opened up new possibilities for developing audiences and markets for popular music. As part of a broader set of liberalisation measures put in place by Moi in the mid-1990s, new television channels and FM radio frequencies were opened up to private broadcasters.

Kenya's first private FM station, Capital FM, went live in 1996. As was the case in many other African countries whose media sectors opened to private interests around the same time, the process 'created a new space, first for access to foreign music then for new local music' (Shipley 2012, 37). Kenya's new FM stations were initially concentrated in major urban centres, and took the safe and easy path toward profitability by programming whatever was popular in the US and UK markets (Cooper 2001; Maina 2006; Njogu and Middleton 2009, xii). As a result, in the words of pioneering new-industry producer Tedd Josiah, 'when the FM stations came … the music they were playing was just hip-hop, R&B, rock – everything apart from Kenyan music' (Tedd Josiah, quoted in Wanguhu, dir. 2007).

The swift colonisation of FM radio by western sounds frustrated established musicians in Kenya, many of whom had advocated for media liberalisation as a means to increase Kenyan content on the national airwaves (Ngujiri 1997). But some musicians in Kenya saw opportunity in the new mediascape. These were young urbanites who were experimenting with contemporary African American and Jamaican styles. Rap and ragga had emerged only a few years earlier in Kenya, first in the coastal city of Mombasa and slightly later in the middle-class enclaves of Nairobi (Eisenberg and Odidi 2018; Gazemba 2015; Ketebul Music 2017, 467–75; Milu 2016, 27). While a few of the Mombasan rappers had made recordings to sell, none of these musicians could see a real pathway to fame or wealth before the FM revolution. The only Kenyan musicians who were earning money with contemporary African American and Jamaican sounds at the time were Christian vocal groups like Five Alive and Hart, who were performing regularly in Nairobi's middle-class churches. The advent of FM radio promised to transform this situation, by creating a new platform for foreign genres that could potentially be used by local musicians working in those idioms.

While digital music technologies have generally lowered the financial bar for music production in Kenya (Mwangi 2007, 322), convincing the new FM stations to integrate local productions into their programming required serious investment. The very first Kenyan releases to achieve significant airplay on Kenyan FM radio came out of studios stocked with tens of thousands of dollars' worth of digital and analogue equipment, and were mastered and pressed on CD to international

standards in Europe. In 1996, the year that the first private radio stations came on the air, Bruce Odhiambo, an experienced musician and recording engineer who had taken up a job in the advertising industry, produced an album for Five Alive using his company's Macintosh-based recording studio. The album received considerable airplay on FM radio, and was heavily promoted on Kenya's first private television station, KTN, by music show host Jimmy Gathu. Soon thereafter, a young producer named Tedd Josiah, who had made a name for himself as a member of the vocal group Hart, scored a number of FM radio hits with tracks by Kenyan hip hop and dancehall artists recorded at high-end digital studios of two different organisations: Sync Sounds Studios, established by members of the successful Kenyan band Mombasa Roots; and Audio Vault (later renamed Blu Zebra), established by Josiah himself in partnership with music entrepreneurs David Muriithi and Myke Rabar.[5] Josiah's compilation albums *Kenyan: The First Chapter* (1997) and *Kenyan: The Second Chapter* (1999), featuring upstart artists he discovered at talent search competitions along with some more established R&B singers, included tracks that would serve as a leading edge for the eventual flood of local content on Kenya's liberalised airwaves.

By the time Josiah released his second compilation, it was clear that a new recording industry was emerging in Nairobi, though no one could say with confidence how it worked or what its scope or trajectory were. Even those who had already found success in this industry could not be certain what its future would hold. Audio Vault, for example, managed to make money through cassette and CD sales for some of their albums, but only by working directly with 'pirates'. This was hardly a strategy for the long term. The label ended up relying more heavily on event and endorsement deals with deep-pocket organisations like the UN and British American Tobacco, and commercial audio work (radio advertisements, audio for television shows, etc.) that came to them by virtue of Josiah's reputation.[6]

A reliance on multiple business strategies and revenue streams has remained the norm in Nairobi's new recording industry. My interlocutors in Nairobi consistently described the industry as a set of multifarious networks, strategies and practices that might someday stabilise into something more 'structured' but had yet to do so. Such accounts were often mediated by the postcolonial discourse of lack (Ferguson 2006, 33). For instance, successful producer Robert 'R-Kay' Kamanzi argued that Nairobi's new recording industry 'is not quite an industry … [because] still we don't have managers, we still don't have publicists; we still don't have, you know, promoters … There's all these things that are still

missing, and it all comes to not having enough money to employ these people to do it …'[7] But many of my interlocutors also emphasised the dynamism that stems from the new industry's underdetermined, improvised character, and how it opens up possibilities for successes large and small. 'Because Kenya the industry is still defining itself', stated young producer Jaaz Odongo, 'there is still so much space for us to create *bona fide* and genuine … Kenyan music superstars'.[8] As always in urban Kenya, where the notion of *jua kali* (informal economic activity) permeates everything from official government policy to everyday discourses of survival (King 1996; Nyairo 2007; Thieme 2013), lack is a problem, even a pathology, but it does not equal blight; rather, it sets up a context in which rapid change – indeed, 'development' – can take place, precisely because very little is prefigured and everything is negotiable.

In the midst of mutable and proliferating business strategies and equally mutable and proliferating genre categories, Nairobi's new recording industry retains a sense of coherence by virtue of its distinctive set of professional roles – roles that did not exist (at least not in the same form) prior to the millennium music boom. The most visible of these is the 'artist', a singer or rapper who purveys a larger-than-life celebrity persona (Nyairo 2004, 69–71; Shipley 2013). More significant, however – or so I argue in this chapter – is the role established by the likes of Tedd Josiah: the 'producer' (sometimes 'creative producer'). Music producers have been around for a long time in Kenya, of course. But the term has taken on a particular meaning in the new industry. Following the parlance of hip hop and electronic dance music scenes in the Global North (Schloss 2004, 41), a 'producer' in Nairobi's new recording industry is a recording engineer who also serves as a composer and/or arranger by virtue of digitally programming accompanying instrumental parts. He (again, there are virtually no female examples) may own his own label and/or production house, work independently, or work as a permanent or temporary employee of a label and/or production house. A producer who owns his own label also takes on the role of 'producer' in the specific legal sense of the proprietor of a master recording (also called an 'executive producer'). Only occasionally in Nairobi's new recording industry does an executive producer become directly involved in composition or arranging. Tabu Osusa, discussed in the second case study, is one such example. Another is Suzanne Gachukia, the most prominent female executive producer in the new industry.

The role of producer in Nairobi's new recording industry is an artefact of the digital age. It could not exist without the digital audio workstation (DAW), a configuration of hardware and software that

enables the creation and manipulation of digital audio signals, and is typically designed for musical production. Now a standard complement to or replacement for the mixing console in recording studios worldwide, the DAW is essentially a studio designed to be controlled by an individual – sometimes even in real time, thanks to specialised software packages like Ableton Live (Prior 2008; Ramshaw 2006). Its word-processor-like approach enables the user to 'cut', 'copy' and 'paste' bits of music literally at the click of a button, and to 'undo' any of these actions. The undo function, which has no real counterpart in an 'analogue' studio environment, breaks down the barriers between the conception, planning and execution of the other functions, thereby allowing an individual to effectively 'play' the studio like an instrument. Meanwhile, the need for specialised musical competences is reduced by the fact that it places at the user's fingertips a store of 'musical patterns, musical styles and musical aesthetics' (Magnusson 2009, 173). Such 'cognitive offloading', as Thor Magnusson calls it (2009, 175), enables a wide range of creative actors, some of whom have little background in music beyond that of an avid listener, to enter into musical production – especially because the characteristically Afrodiasporic, 'iterative-variative' style of Kenyan urban youth music lends itself to modular, 'musematic' compositional practices like looping (Magnusson 2009, 171; Toynbee 2000, 97). By concentrating creative agency in individual actors while diminishing the need for specialised musical competences, the DAW enables the confluence of aesthetic and entrepreneurial practices that mark production in Nairobi's new recording industry.

The vernacularising impulse

In addition to its distinctive roles, what lends coherence to Nairobi's new recording industry is the existence of the *old* recording industry. River Road stands as the new industry's 'constitutive outside', the negative term in relation to which it is identified and identifiable (Derrida 1973). New-industry agents consistently praise it for being where the 'real money' is, while also disparaging it for its *jua kali* (informal) approach to production. In my research, I came to understand these judgments as ways for new-industry agents to make sense of their own industry as a field in which money does not always follow effort but agents nevertheless strive for an 'international' standard of quality.

Even more than its professional practices, it is the *sounds* of River Road that provide a constitutive outside for the new recording industry. While it is evident that postmillennial popular music has

developed in dialogue with global genres like hip hop and ragga, the case studies in this chapter reveal that it has also developed in dialogue with the music produced in River Road. Rather than inspiration and connection, however, the dialogue between postmillennial popular music and so-called 'vernacular' popular music has been grounded in opposition.

New-industry agents often talk about vernacular popular music as the flip side of the music their own industry tends to produce. The iconic vernacular genre – the one that has kept the major studios in River Road running 24 hours a day for decades – is *benga*, an up-tempo dance music first developed by Luo musicians in western Kenya. *Benga* features: simple, repetitive vocal melodies, coloured with tight harmonies; driving percussion grounded in a strong, duple-meter pulse on the bass drum; 'a swooping, plunging bass line' (Stapleton and May 1987, 230-31); and, most importantly, multiple, interlocking guitar parts executed in a 'bouncy' fingerpicking style that recalls the sound of the traditional Luo *nyatiti* lyre (Ketebul Music 2017, 65). While the Luo have retained their reputation as the progenitors of the genre, Kisii, Luhya, Kikuyu and Kamba musicians have all developed their own distinctive forms, bringing the *benga* sound to a large swathe of Kenya's small towns and rural areas, and giving the genre a substantive claim to being Kenya's 'national' music (Ketebul Music 2017; Flee and Paterson 2017). In its sounds – and, indeed, in its 'national' stature – *benga* stands for new-industry agents as everything their music is not.

The most conspicuous element of the *benga* sound is the 'tinny' (Wainaina 2012, 152) sound of electric guitars playing linear patterns in the upper register of the instrument. This is a sound that connects *benga* to other Kenyan genres that had their heyday in the 1960s (Swahili-language *rumba* and *twisti*) and Congolese popular music genres (*rumba* and the various forms of *soukous* that have emerged since the 1970s), all of which have influenced and been influenced by *benga*. For Nairobians who came of age around the turn of the millennium, this sound carries important associations of generation and class. It signals the musical tastes of their parents, and the social milieus of rural dwellers and those in the lower economic strata of urban society. The late Kenyan writer Binyavanga Wainaina explores these semiotic valances in his memoire, *One Day I Will Write About this Place* (2012), in a passage reflecting on his own youthful aversion to Congolese music. For the young Wainaina, the sound of the guitar in Congolese music was inextricably linked with the everyday soundscape of a labouring class to which he felt no real connection:

> Thin men, with corrugated brown teeth from *miraa*, and muscular jaw muscles, and glazed, wild eyes, focused on one repetitive task. And from them, from their speakers comes the sound of Congo—and this sound is exactly the sound of all the clang, the rang-tang-tang, tinny clamor of agitated building, selling, and the multilingual clash of mouth cymbals, lifting up and down, jaws working, eating, trading, laughing.
>
> (Wainaina 2012, 152)

At the end of this passage Wainaina shifts into a more empathetic mode and develops what might be called an acoustemological theory of the affective power of the Congolese/River Road guitar sound for Kenyan labourers: 'Your labor can beat, bend, melt, harden, shape, aggregate, galvanise. Labor that can defeat tiredness, because dance and song is labor that leaves you exhilarated. This is rumba. *Mabati* [corrugated iron] music. Metal music' (153–154).

Along with the *mabati* timbre of the guitar, the sound of River Road is the sound of 'vernacular' languages. *Benga* and related vernacular genres are not simply performed 'in the vernacular', they are oriented towards native speakers of vernacular languages, often employing deeply poetic registers that could never be fully appreciated by outsiders. This is why vernacular music has often been deemed a danger to social and political order in Kenya – why it was kept off the radio during the Moi era, why it was investigated as a site of hate speech following the post-election violence of 2007–2008. This ethnic, or 'tribal', aspect of vernacular music stands in stark contrast to postmillennial popular music, which is understood as having sprung from the 'tribeless generation' of city-dwelling Kenyans who were born after independence and were the first (African) Kenyans to truly feel at home in the de-ethnicised milieu of the city (Nyairo 2015, 236).

Creative agents in Nairobi's new recording industry have generally viewed the gulf separating their 'urban' sounds from the 'vernacular' sounds of River Road as more of a problem to be solved than an achievement to be celebrated. As a former settler colony that achieved independence in the wake of violent ethnic resistance, Kenya has been beset by special postcolonial 'anxieties' over questions of cultural identity and authenticity (Mbũgua wa Mũngai 2007, 49–51). Postmillennial popular music has dredged up these anxieties anew, by invoking the spectre of 'musical colonisation' as a new engine of cultural deracination and historical amnesia.[9] In this context, new-industry agents face pressure – from critics, audiences, fellow creatives and themselves – to make

authentically 'Kenyan' sounds. One way they have sought to do so is by *vernacularising* their 'urban' productions, in the sense of drawing them closer to the aesthetics of River Road.[10] As diverse as their stories are, we will see that each producer profiled below has built a career and organisation to some extent around the idea of vernacularising urban sounds.

Case 1: Lucas Bikedo and Ogopa Deejays

Situated in the unassuming South B housing estate between Nairobi's central business district and Industrial Area is one of the most successful organisations in Kenya's new recording industry – Ogopa Deejays. Despite its name, Ogopa is not a DJ outfit but a record label and production house. As a label, it operates according to a 360-degree model, handling production, distribution, management and publishing for artists in exchange for a share of revenue generated by any means. Meanwhile, it has long maintained a reputation as Nairobi's premier production house for both audio and video, commanding the highest fees for such services.[11] In recent years, Ogopa has moved into other areas of media production as well, including radio and television advertisements, while also opening international branches in Namibia and South Africa. Based on an extended interview with Ogopa cofounder and lead producer Lucas Bikedo,[12] this case study describes the role of aesthetic entrepreneurship in the early rise of Ogopa Deejays to a position of dominance within Nairobi's new recording industry.

On Bikedo's suggestion, he and I met at the cafe of the Oil Libya gas station in South C, near to his studio. He had already finished his tea by the time I had arrived, but he was in no rush to leave. For the next two hours, he related his story and answered my questions, sitting with his empty cup and my portable audio recorder on the small table in front of him. He demurred only when I asked for figures relating to the size or profitability of his business. I expected as much, however, based on previous experiences in my research. Transparency in such matters is rare in Nairobi's music economy.

Bikedo founded Ogopa Deejays around 1999 with his brother, Francis Bikedo, shortly after returning from Lahore, Pakistan, where he was studying graphic design. At the time, the brothers – or 'partners', as they prefer to say – were merely giving a name to their DJ outfit, which was thriving on contracts from Homeboyz Entertainment Company. But Bikedo had a deep interest in producing music, fostered by personal

interactions with pioneering Kenyan youth music producers like Tedd Josiah in the mid-1990s, and experiences in Pakistan.

Though his parents had sent him to college abroad largely to get him away from DJ-ing and hanging out in recording studios, Bikedo managed to start a band in Lahore. The band, which performed an eclectic mix of techno, bhangra and rap, offered Bikedo his first opportunity to perform on stage (he was the group's rapper) as well as to create 'beats' using a keyboard workstation with an onboard digital (MIDI) sequencer. He continued his creative activities after his return to Kenya, so that even before he and Francis transformed Ogopa from a DJ outfit into a record label he was already trying out some of his own hip hop and dancehall tracks at gigs. He described this creative experimentation to me as 'research' that he and his brother were carrying out in preparation for moving into production. The brothers/partners also spent many hours listening to and analysing music that was popular on FM radio and in Nairobi's public transport vehicles. 'We [would] go round and round in circles trying to say, okay, why does this [work]?' recalled Bikedo. 'That analysis actually got us to where we are now.'

Because he could neither play a traditional musical instrument nor read music, Bikedo did not consider himself to be a 'musician' when he first began to make his own music. Even by the time of our interview, with a decade of experience producing hits under his belt, he still refused the label. If anything, he said, 'I am a good programmer' and someone who 'know[s] how to imitate'. One of Bikedo's collaborators, singer and Berklee-trained recording engineer Viola Karuri, characterised his 'imitative' capacity in a more positive light, as a matter of having 'an ear that captures things'. Such an ability, she argued, is common to all successful musicians.[13]

While I am inclined to agree with Karuri that Bikedo is as 'musical' as any self-styled 'musician', Bikedo's denial of his own musicianship points to a crucial aspect of the story of Ogopa Deejays, and the larger story of Kenya's new recording industry of which it is a part: the role of digital music technologies in removing traditional barriers to creative work in music. The move Bikedo made from DJ-ing to composing would have been far more difficult a decade earlier. But the advent of the MIDI sequencers had made it 'a small step' for any talented DJ (Langlois 1992, 230). By 'blackboxing' the process of sound synthesis and many aspects of musical performance and composition, such technologies enable a creative actor with a high degree of familiarity with a style of music – particularly a repetitive, loop-based style like hip hop or dancehall – to begin to create new music without the need for the highly specialised

knowledge and cultivated skills that Bikedo and many others consider to be hallmarks of musicianship (Magnusson 2009; Pinch 2008).

As much as Bikedo didn't consider himself to be a 'musician', neither did he consider himself to be an 'audio engineer', at least in the early days. His training in the field of audio engineering consisted of little more than observing other producers at work in Nairobi and perusing *Sound on Sound* magazine on the internet.[14] He learnt quickly, however – all the more so because he had to make do with very little at first. His first 'studio' consisted of little more than a Korg M1, a keyboard-synthesiser workstation whose on-board MIDI sequencer and production effects enable users to create complexly layered digital compositions. The M1 had already been discontinued by that time, but it was still prized, even in Europe and North America, for its simple interface, preprogrammed sounds (many of which had become iconic of 1990s popular music), and the ease with which these sounds could be manipulated (cf. Vail 2002). Bikedo also integrated PCs and a PC-equipped studio into his process, but these had to be borrowed or rented. He would sequence all instrumental tracks on the M1, 'output' a rough cut onto an analogue or digital tape (audiocassette or DAT), and then take that to a studio to lay down vocal tracks (sometimes performed by Bikedo himself, though few Kenyans today are aware that he had ever put his voice on a recording). After recording the vocals, he would go back to the M1 to 'rebalance' his sequenced tracks to get a good stereo master. Finally, he would upload this mix along with the vocal tracks onto a PC at a friend's internet cafe, where he would do the mixing and mastering with whatever DAW software was available. It was, in Bikedo's words, a 'tedious' process, especially since outputting had to be done in real time.

River Road uptown

Bikedo described his initial attempts at production as failures. Around 2001, after reflecting on why 'no one [in the clubs was] actually moving to' the first twenty or so tracks he had produced, he knew he had to change tack. What these early experiments had taught him, if anything, was that he could not rely on his own sense of taste. His middle-class background and mobility had taken his musical sensibilities too far from that of the average urban Kenyan. He turned back to the listening portion of his 'research' and tried to bring new ears to the matter. What he came up with was a new aesthetic approach, which he described to me as '[bringing] River Road uptown'.

What Bikedo meant by 'River Road' in this context was something at once broader and narrower than 'vernacular music'. He meant, in the first place, music that sounded right and familiar to the ears of Kenyans outside of his own middle-class-Nairobi social world. He wasn't going to start producing *benga*, of course. Even if he could do that, it wasn't actually the *benga* audience he was after, but rather their Nairobi-born kids. 'People want songs that they can feel attachment [to] in terms of their upbringing', he explained to me:

> Because most people, even if you are metropolitan, your folks either moved from the village, rural settings. So … chances are you grew up at home and you were brought to Nairobi. So there is that thing that you have embedded in your system, that music is meant to be like *this*.

The aim in 'bringing River Road uptown', then, was to inject his urban productions with that bit of the vernacular that he believed remained 'embedded' in the hearts and minds of so many young Nairobians. If he succeeded, he felt, the advantages might go beyond getting youth in Nairobi to dance to his tracks. It could even lead to true *national* success. 'If you want to actually be a star', Bikedo declared, striking the table between us hard enough to shake his empty cup, 'you have to be a star in Kisumu, Mombasa, Nairobi, Nanyuki, you know, [and] all these other rural areas. Because you are looking at a cumulative following.'

The sound of 'River Road' that Bikedo intended to bring 'uptown', as he carefully explained to me, was not *benga* or any other vernacular music, but rather a style of ragga developed by two Kenyan musicians in the late 1990s. Only one of these musicians was actually associated with the River Road recording industry. But this was beside the point for Bikedo. It was the aesthetics, and more importantly the *audience*, of this music that, for him, captured the essence of River Road.

The River Road ragga that Bikedo was interested in can be heard in the late 1990s output of two artists: Mighty King Kong (Paul Otieno Imbaya) and Musaimo wa Njeri (Simon Kihara). Uganda-born King Kong started out performing in nightclubs in Nairobi, Kisumu and Mombasa in the 1990s. Disabled by polio, he used a wooden pole to stand and get around quite ably. This, in addition to his personal story of having lifted himself up from a life begging on the streets of Kisumu, lent him credibility with poor and working-class Kenyans, including those who might not have otherwise had an interest in his Jamaican-derived style. His first album, *Lady's Choice*, released in 1999 by Maurice Onyando's Next Level

Studios, is generally considered to have been one of the most successful Kenyan albums of the period. King Kong died in 2007, many believe from intentional poisoning related to his political activities. Musaimo is a Kikuyu *benga* artist who briefly experimented with ragga in the late 1990s. His 1998 release 'Mwigerekanio' (Copy-catting), about the problems that come with trying to keep up with one's neighbours, was enormously popular among fans of Kikuyu *benga* and beyond. Though rich in poetic language and cultural references that only Kikuyu listeners could be expected to fully comprehend, the song's Jamaican-dancehall beat – along with brief refrains at the end in Swahili, Taita, Kisii (Gusii), Luhya and Luo – succeeded in garnering a much wider audience than would normally be expected for a Kikuyu *benga*. (Ketebul Music 2010, 48–50).

Bikedo recalled that his first reaction to King Kong and Musaimo was something akin to culture shock.

> There was a gig that was happening [in downtown Nairobi]. At that time there was a lot of [advertising] road shows, and big crowds used to turn up. I didn't know the artists that were performing and there was a guy called King Kong. He was a crippled guy ... He comes onto stage, I am like, 'Okay, who is this?' … These [guys in the audience] are wearing the FUBU/Nike thing, and they are crazy about this guy. What is he going to do? … Because I never heard his music.
>
> When he played his song, it was the most ridiculous song I had ever heard in my life. I had never heard anything like that. I was like, 'This doesn't work. I don't understand this. There is a disconnect'. These guys [in the audience] like hip hop: what the hell are they listening to? It was really shady – ridiculously shady! I'm like, 'That beat, listen to that beat, what the hell is this?'
>
> Then there was another guy called Musaimo. He had done a song where he took [a] rapper, really bad rapper who rapped in different languages – one Luhya, one English, one Swahili, and he is a Kikuyu guy. Then he sang in his Kikuyu dialect. When I heard it first I was like, 'This is rubbish. That guy raps horribly.'

'That beat' that Bikedo could not understand, or at least stomach, upon first hearing involves a steady pulse in the bass drum and snare hits on the pickup to the second beat and between the second and third beats, giving the overall effect of a 3+3+2 rhythmic syncopation against a steady pulse. The 3+3+2 pattern – a gesture 'so characteristic (although not

exclusively so) of African-derived rhythms and occasionally referred to in the Cuban context as the *tresillo*' (Manuel 1985, 251) – had already been well established as a key element of Kenyan popular music. It first became commonplace in locally recorded popular music in the 1950s, when it was imported from Congolese popular music, which had adopted it from Cuban popular music (Eagleson 2014, 29). But the specific source for King Kong and Musaimo was Jamaican dancehall. Their particular 3+3+2 beat was what Manuel and Marshall (2006) call the 'default beat' of late 1980s and early 1990s Jamaican dancehall. Musaimo's 'Mwigerekanio' was almost certainly inspired by Jamaican duo Chaka Demus & Pliers' 1994 hit 'Murder She Wrote', which features a particular version of the 'default' beat in the guise of Sly & Robbie's 'Bam Bam' riddim. 'Murder She Wrote' was then a mainstay in Kikuyu bars, in the form of the parody 'Mama Ciru' ('Ciru's mother'), performed by 'one-man guitarists' working in the Kikuyu musical entertainment genre known as *mũgiithi* (Mũtonya 2003, 16; 2007, xvi).

While he was surely aware of the Jamaican origin of King Kong and Musaimo's beat, Bikedo described it in our interview as something more broadly 'African', calling it a 'description of African rhythm'.

> I came to realise that very many countries actually have that as their African traditional beat, from Zambia to South Africa. *Kwaito* was a variation of the same thing. Zambia: their *benga* is like our *benga*, you know? So wherever you go, even to Uganda, there is that unifying thing that was all over.

Bikedo's comments here resonate with the statements of scholars of African and African American musics about the role of rhythm in fostering an Afrodiasporic 'musical interculture' (Monson 1999; Floyd Jr. 1999; Manuel 1985; Roberts 1998). Indeed, the idea of the 3+3+2 pattern as a 'description of African rhythm' bears a strong resemblance to Samuel Floyd Jr.'s characterisation of it as 'one of the central symbols of African-diasporal musical unity' (Floyd Jr. 1999, 30).

Convinced that the River Road dancehall beat carried the secret to reaching out beyond middle-class Nairobi, Bikedo set about trying to bring the sound into his own productions. His plan began to take shape after he linked up with two Ugandan dancehall singers who had come to Nairobi in search of opportunities to record: Bebe Cool (Moses Ssali) and Jose Chameleone (Joseph Mayanja). Like a handful of other artists who would end up working with Ogopa in the early 2000s, Bebe Cool first sought to work with Tedd Josiah but was turned away. Josiah, who could

afford to be choosy by that point, was 'tired' of producing the 'urban sound', preferring instead to focus on Afro-fusion (more on this in the next case study) (CTA 2018). Together with Kenyan dancehall singer Redsan, Bebe Cool and Chameleone formed Ogopa's first stable of artists, calling themselves the 'Bashment Crew'.[15]

Bikedo described the production of Chameleone's Swahili-language track 'Mama Mia' in 2000 as a watershed moment for his River Road strategy. The work was undertaken in the wake of Ogopa's first hit, Chameleone and Redsan's 'Bageya', which was released the year before.[16] A Baganda folk song reworked as a driving pop song, 'Bageya' has an ineffable appeal that offered no clear formula for repeat success. Chameleone, as Bikedo recalled, 'was really frustrated and stressed out on how he is going to top … what he had done'. According to Bikedo, Chameleone was not fully convinced by the idea of incorporating a River Road sound. This only makes sense. For Chameleone and the rest of the Bashment Crew – young, cosmopolitan artists poised at the edge of a new millennium – the default dancehall beat of the early 1990s would have seemed passé. But Chameleone ultimately went along with Bikedo and even supplied an element of the song that most directly recalls River Road dancehall experiments: a melodic figure with a wide bend, sequenced in an upper octave, in what sounds like a modified nylon-string guitar sound. The figure, laid down by Chameleone himself on the M1, is featured in the introduction and throughout all the refrains. It recalls the synth flute riffs in Musiamo's 'Mwigerekanio', which, in turn, recall the melodic role of the guitar – and decades ago, the accordion – in Kikuyu *benga*.

'Mama Mia' initially 'met some really serious resistance', according to Bikedo. 'All the [radio] presenters, they knew music should be hip hop … They were safer playing the American music, European music, because they knew, "I can get away with this." … What we brought in [with Mama Mia] was … classified as "shady".' But after a year or so of slowly gaining popularity in dance clubs, the track started receiving radio play. Once on Kenyan radio, it quickly became a sensation across the entire region, turning Chameleone into arguably the biggest popular music star in Ugandan history and establishing Ogopa Deejays as the darling of Kenyan FM radio for the better part of the next decade.

The inevitability of genre

Though I had familiarised myself with the story of Ogopa Deejays before meeting with Bikedo, his claim to having been inspired by the sounds of River Road came as news to me. As he spoke, I couldn't help but wonder

how I had managed to miss this important aspect of the history of Nairobi's new recording industry. Later, upon delving back into Kenyan journalists' writings on Ogopa and Kenya's millennial popular musics, the answer became clear: Kenyan journalists had missed it as well. Either Bikedo had never broached the matter with journalists (which is possible, given his reluctance to be interviewed), or journalists who had managed to speak with him didn't think Bikedo's reflections on River Road were important enough to report on. Moreover, Kenyan journalists rarely reflected on the audible connections between the Ogopa sound and contemporary *benga*. This silence is most striking in the journalistic discourse surrounding the success of the 2006 song 'Adhiambo C', a collaboration between Ogopa-signed hip hop duo Deux Vultures and Luo *benga* singer Dola Kabarry. If ever there had been an opportunity to discuss connections between the Ogopa sound and the River Road sound, this would have been it. But media discussions of 'Adhiambo C' focused, instead, on the supposed novelty of the track as 'the first time these two opposing genres of Kenyan music [(hip hop and *benga*)] are teaming up to produce a song that cuts across age barriers' (Ngunjiri 2006). Something of an explanation for the lack of reflection on the influence of River Road on Ogopa may be found in Born's argument that genre is inherently 'oriented to the production of teleology and thus the erasure of its own contingency' (Born 2011, 384). That is to say, the reason why Bikedo's productions have not been heard by those outside of the Ogopa inner circle as a conscious synthesis of the vernacular and the cosmopolitan is because the Ogopa sound, in its success, came to be heard as meeting the tastes of a pre-existing urban youth music audience that, in fact, it had helped to bring into being.

Building a sound organisation

Following the success of 'Mama Mia', Ogopa expanded their stable of artists to include not only dancehall singers, but also rappers and R&B singers, all performing in Swahili. The Bikedos, together with a manager they brought on board named Emmanuel Banda, came to see each new artist as a long-term project and required a five-year commitment from him or her. This approach presumably came about through the realisation of how much more money they could have made had Chameleone stayed with the label longer. At the time, there was no way to generate significant revenue by owning a copyright or master recording right. Radio stations were not paying out royalties as they were technically required to do by law, and even the most popular urban youth music albums would sell only

a few thousand CDs. For the most part, hit songs could only be monetised through club dates, corporate events and artist endorsement deals. A 'partnership' arrangement between label and artist – what is now referred to globally as the '360 deal' (Marshall 2013) – was thus natural. Such an arrangement only works for the label if the artist remains in the partnership for some time *after* becoming a 'star' (Marshall 2013, 91–3).[17]

Bikedo brought his River Road strategy to Ogopa's new artists, but now he was using a PC-based recording studio running the DAW software Fruity Loops. Having a stable of artists all working with the same producer helped to consolidate an identity for Ogopa Deejays. They became a brand, and their music a genre. They were soon pushing the genre title *boomba* for their output, most explicitly with the 2003 track 'Boomba Train' by E-Sir and Nameless. In at least one respect they were successful in this effort: since 2004, the Kisima Awards (founded by Tedd Josiah) has recognised 'boomba' in its award categories. But another descriptor for Ogopa's music also took hold: *kapuka*, an onomatopoeia for the default dancehall beat.

Ogopa's success in establishing *kapuka* as a genre is evident in how they became a target of opprobrium from others within Nairobi's youth music scene. 'Haters', Bikedo told me, came from two directions. First, there were the 'real musicians', who played instruments and made harmonically complex music. They referred to Bikedo and his ilk dismissively as 'Fruity Loops musicians'. Second, there were the self-styled 'underground' hip hop artists, who saw in Ogopa the vulgar commercialisation of Kenya's still-emergent hip hop culture. It was an underground group, K-South, who popularised the term *kapuka* in the first place. In their 2004 song 'Kapuka Dis' they declare:

Na kwa wale emcees *wote ambaye wanaroga*	(And as for all those emcees who are so bewitching)
Wacheni kutumia tu ka-beat *moja*	(Leave them to use their one and only beat)
kapuka this, *kapuka* that, *kapuka* this, *kapuka* that…	

To be sure, such 'reflexive debates and disagreements about rules and boundaries' played a role in establishing *kapuka* as a genre (Shipley 2013, 131–2). But as we have seen, the Ogopa sound is not just an artefact of discourse. It is also a set of audible gestures that derive from the work of Lucas Bikedo and his artists to create an 'affective coalition' (Born 2011, 2012) out of 'the bigger chunk of people who are not urban'.

Case 2: Tabu Osusa and Ketebul Music

If the development of *kapuka* affirms Born's theory of genre as a process of figuring new 'affective alliances', the example of Kenyan Afro-fusion extends this theory, by suggesting that, on occasion, a musical genre may endure and grow precisely because of the value that is perceived to inhere in the very *attempt* to build such alliances. Fostered by Nairobi's NGO sector and cosmopolitan middle class, and linked to the global 'world music' festival circuit, Kenyan Afro-fusion is marked by an aesthetic emphasis on live instrumentation over digitally programmed accompaniments, and the attempt to 'fuse' African aesthetics with Western popular music. It has thrived, as I will describe, on patronage from nongovernmental cultural institutions that find value in its underlying aim of cultivating a modern 'Kenyan' sound.

Developing Afro-fusion

Kenyan Afro-fusion arrived on the scene soon after the turn of the twenty-first century, beginning with Luo hip hop duo GidiGidi MajiMaji's remarkable album *Ismarwa* (meaning 'What is Ours'), produced by Tedd Josiah at Audio Vault in 2000. Replete with the sounds of traditional Luo instruments, melodies and rhythms, *Ismarwa* presents itself as 'a conscious effort [by GidiGidi MajiMaji] to "go back to their roots" by sitting at the feet of old people and listening to them for inspiration' (Samper 2004, 39). Josiah, for his part, has described it as a creative experiment motivated by his own desire to 'create something that is authentically Kenyan' (CTA 2018). Commenting on the album for *The Internationalist* soon after its release, he opined, 'If you're an African there are certain cultures, certain traditions that you've grown up with – our language, our musical styles – and we have to actually go back to those things' (quoted in Cooper 2001).

A year later came another landmark for Kenyan Afro-fusion singer-songwriter Eric Wainaina's debut solo album *Sawa Sawa* (2001), still the most successful Kenyan Afro-fusion album of all time. Wainaina had begun his career in Kenyan music as a member of the R&B vocal group Five Alive before heading off to the Berklee College of Music in Boston. While there he honed an Afro-fusion style that he would come to describe as a 'blend of *benga* rhythm and modern harmonies' (Smithsonian Folklife Festival 2014). *Sawa Sawa* became massively popular in large part because it provided a timely interrogation of Kenyan democracy and

nation building (see Nyairo 2010b). The biggest hit off the album, '*Nchi ya Kitu Kidogo*' (The Country of Something Small), is a playful yet trenchant critique of political corruption in Kenya under then-President Daniel arap Moi that earned Wainaina a reputation at home and abroad as a democratic activist as well as an artist (Matheson 2001).

While *Ismarwa* and *Sawa Sawa* have left indelible marks on Kenyan music and culture, it was arguably Alliance Française de Nairobi's entry into the scene that has done most to solidify Afro-fusion as a genre. The Alliance leadership viewed supporting Afro-fusion as part of their institution's mission to promote 'artistic and cultural diversity'. Then-director Gérard Saby and others at the organisation felt that they could play a role in elevating Kenyan musicians to the level of global success that had already been attained by the likes of Senegal's Youssou N'Dour, by supporting Kenyan artists and producers who were oriented toward crafting a similarly cosmopolitan yet distinctly African sound.[18] In 2001, they held the first of what would become four annual *Fête de la musique* (world music day) concerts to support Kenyan Afro-fusion artists. Each concert featured a different emerging musician or group, and was followed up with a studio recording under the direction of Tedd Josiah. Josiah produced debut albums for four influential Afro-fusion acts through this programme, including one for internationally renowned singer-songwriter Suzanna Owíyo.

Alliance Française continued to patronise Afro-fusion long after Josiah had moved on from the genre, drawing support from the French government, the European Union and corporate sponsors. Other international cultural institutions and embassies in Nairobi have joined in, creating a large and complex system of institutional patronage. Underpinning this system is the broader context of the 'cultural turn' in development theory and practice, which enables a popular music genre grounded in local traditions to be conceptualised as a 'resource' for economic and social development (Yúdice 2003). At once cosmopolitan and self-consciously grounded in local traditions, Afro-fusion responds to the cultural turn's emphases on cultural heritage as a source of sustainable economic growth (Barrowclough and Kozul-Wright 2008) and a tool for intercultural dialogue that may strengthen the 'fiber of civil society' (Yúdice 2003, 2). This case study discusses an aesthetic entrepreneur who has become the most significant figure in Kenya's Afro-fusion scene – and, by extension, one of the most significant figures in Nairobi's new recording industry – by articulating approaches to popular music production that speak to these emphases.

Nairobi City

Born in western Kenya in 1954, William 'Tabu' Osusa cut his musical teeth singing and composing popular music in the dynamic music scene of Kinshasa during the mid-1970s. When Congolese bands started moving to Nairobi during the 1980s seeking security and stable employment, Osusa positioned himself as a broker between the worlds of Kinshasa and Nairobi, becoming the manager of Samba Mapangala's Orchestra Virunga. After the break-up of Orchestra Virunga and Mapangala's emigration to the US in 1997, Osusa took a break from music, spending a few years in a self-imposed exile the UK. During this hiatus, he watched the millennium music boom radically transform the Kenyan music economy, occasionally commenting on it in radio interviews and newspaper op-eds. As he would later describe to Kenyan scholars Joyce Nyairo and James Ogude, he saw the millennium music boom as a distressing rejection of local musical sensibilities among a new generation, but also as moment filled with opportunities for someone with his experience and 'professionalism'. 'There is a lot of good music in the country but … they sound so much American', he remarked. 'You wouldn't even know it is Kenyan music' (Nyairo and Ogude 2003, 385).

Osusa returned to the music scene in Nairobi in 2000, committed to a project of reinserting 'Kenyanness' into Kenyan popular music. He brought together a diverse group of performers from his own Luo ethnic community – including Kenyan rap innovator Poxi Presha, actress-cum-singer Iddi Achieng', and eventually traditional musician Dokta K'Odhialo – under the aegis of what he named the Nairobi City Ensemble. The project ultimately produced two albums (Nairobi City Ensemble 2002; 2009) that 'fuse' traditional ethnic Luo sounds with Congolese popular music, R&B and other global sounds, while reflecting on modern Kenyan experiences in multilingual lyrics (Nyairo and Ogude 2003, 2007).

The Nairobi City albums feature electric guitar and traditional instrument tracks layered over MIDI-programmed tracks carefully calibrated to sound as close to live as possible. The 'process was digital', Osusa told me, but the 'product' was not.[19] Working at Next Level Studio in Nairobi, Osusa conducted a simultaneous process of composing, arranging, recording and mixing, assisted by other 'producers' (in the new-industry sense) with facility on a DAW. Osusa and his collaborating producers pieced together individual cells of musical material on a timeline, copy-pasted and otherwise manipulated as necessary, resulting in a 'fusion' that, however 'live'-sounding, exemplifies Bakhtin's notion of an 'artistic hybrid': 'stylised through and through, thoroughly

premeditated, achieved, distanced' (Bakhtin 1981, 366). While the musicians surely made unique contributions to the process, they worked much like actors in a television series, receiving scripts and directions episodically, never knowing what the entire work would be like until it was completed.

In the view of Nairobi City singer Iddi Achieng', Osusa's nonlinear process was the best possible way to create the novel 'fusion' he had envisioned, especially given that Luo traditional singer Dokta K'Odhialo had 'never sung to this kind of backing instrumentation before in a studio'.[20] But it really was not all that different to what Lucas Bikedo and other producers within Nairobi's new recording industry were doing. As much as he may have been seeking to disrupt the status quo of Kenya's millennial popular music, Osusa effectively followed the lead of Bikedo and others in using the DAW as a way of concentrating creative agency to effect an aesthetic-entrepreneurial strategy.

The Nairobi City recordings achieved some local airplay and international sales and even made it onto the top-seller chart of international African music distributor Stern. But far more significant for Osusa's career, and for Nairobi's new recording industry, was the project's reception by Kenyan cultural studies scholars Joyce Nyairo and James Ogude, who found in Osusa's unique 'cosmopolitan-nativist' style a multilayered exploration of the postcolonial condition and the politics of identity in urban Kenya (Nyairo and Ogude 2003, 397; Nyairo and Ogude 2007). Scholarly analyses of popular music rarely have a direct impact on music careers and economies (for better or worse). But this case is different, because lead author Joyce Nyairo would soon be in a position to support Osusa's endeavours, as a programme officer for the Ford Foundation in East Africa.

From music production to intellectual production

Upon becoming a Ford Foundation programme officer in 2007, Joyce Nyairo set about working with Osusa to establish an arts organisation geared toward documenting the history of Kenyan popular music. Osusa had already founded a commercial recording studio in the wake of the success of Nairobi City, situated in the Ford Foundation-supported GoDown Arts Centre in Nairobi's Industrial Area. He named it Ketebul Productions, based on the word for 'drumsticks' in his native Luo language. With Nyairo's guidance, he expanded this organisation to include a non-profit wing called Ketebul Music, with a mission to 'identify, preserve, conserve and to promote the diverse music traditions of East

Africa'. This change meant the establishment of a board of directors, for which Osusa brought in two men from the world of journalism, political cartoonist Paul 'Maddo' Kelemba and journalist and broadcaster Bill Odidi (the latter, like Osusa, had been an interlocutor for Joyce Nyairo's research). Kelemba and Odidi both brought ideas and skills to the table that would prove essential for carrying out the Ford Foundation-funded research projects.

Between 2007 and 2012, Nyairo oversaw the disbursement of hundreds of thousands of dollars in Ford Foundation funding to Ketebul Music, to support research on the history of Kenyan popular music.[21] With these funds, Ketebul produced a series of multimedia documentaries on Kenyan popular music, each sold as a package that includes an illustrated book, a video documentary on DVD and a compilation album on CD. Titled *Retracing Kenyan Music*, the series includes volumes on *benga*, Kikuyu popular music, Kenyan funk and soul of the 1960s and 70s, and Kenyan songs of protest – all based on research carried out by Ketebul board members and consulting researchers, with support from Joyce Nyairo.[22]

While the *Retracing* work represented a departure from music production, it could also be seen as a natural extension of Nairobi City. Reflecting on *Retracing* in the 2015 Routledge volume *Preserving Popular Music Heritage*, Tabu Osusa and Bill Odidi contend that it was oriented toward 'enhancing the debates on Kenyan identity' by exploring Kenya's 'cosmopolitan cultural heritage' (Osusa and Odidi 2015, 179). Nyairo and Ogude happen to describe Nairobi City in quite similar terms, as 'a music aimed at transforming the landscape of self-understanding as well as the articulation of the complex and contradictory impulses that define the nation called Kenya' (2003, 383).

Curating a genre, building a label

The *Retracing* work indirectly supported Ketebul's music production activities, covering overhead costs, enabling the purchase of high-end audio and video production equipment and building capacity in terms of human resources and experience in video production. Meanwhile Ketebul was also receiving direct support for its music production activities, through a separate institutional relationship with Alliance Française de Nairobi. Osusa's connection at Alliance was Harsita Waters, a Kenyan of Indian descent who parlayed a fluency in French, training in business administration, and a passion for the arts into an important post at the organisation. Waters and Osusa began working together as soon as Osusa

had re-entered the Kenyan music scene in the early 2000s to organise music programmes as part of the French Embassy's Cultural Cooperation initiative. At the time, Waters was working with the French Cultural Centre, which had gained a reputation as a premiere Kenyan cultural centre (Ondego 2004). In 2004, the French Cultural Centre, including Waters' office, was absorbed into Alliance Française de Nairobi.

As soon as Waters joined Alliance, she enlisted Osusa's assistance in developing an ambitious programme that would build on the Afro-fusion-oriented work that had been undertaken by the organisation in partnership with Tedd Josiah. 'Spotlight on Kenyan Music', as this programme came to be known, involved a series of free concerts at Alliance Française and linked recording projects at Ketebul Music.[23] The concerts proved phenomenally popular, especially among students from the nearby University of Nairobi, and the associated studio recordings received positive critical attention, even if they didn't sell particularly well. All this helped turn the programme into an annual event. Ultimately, Spotlight would last for a decade, from 2005 to 2015, thanks to funding from French oil company Total, among other sponsors, as well as occasional logistical assistance from the Kenyan Ministry of Culture and Permanent Presidential Music Commission. For the first six years of the programme, Osusa, Waters and the other members of the Spotlight on Kenyan Music steering committee curated it by holding competitive auditions around the country to choose artists to perform in the annual concert series and 'finalists' to record a song or two for the associated compilation album. After the eruption of interethnic violence across Kenya following the 2007 presidential election, the organisers began to frame the programme differently, as a way to promote reconciliation by celebrating Kenya's cultural diversity (Morin 2012, 213–16). This ultimately led to changes in the structure of the programme, including an abandonment of the competition format, as I will discuss.

In addition to a source of revenue for Ketebul, Osusa used the Spotlight programme as a testing ground for his aesthetic entrepreneurship. In the process of judging, presenting and producing dozens of musicians over ten years for the Spotlight compilations, he experimented with aesthetic directions and even – as we will see – worked out new modes of patronage. Osusa could only use Spotlight in this way by wielding a great deal of influence over the direction of the programme, which he was able to do by co-chairing the Spotlight committee with Waters. Osusa's views were strongly reflected in the committee's work from the start. According to Waters, the committee quickly determined that Spotlight should aim to address the lack of 'professionalism' in

Kenyan music and the failure of Kenyan musicians to develop a discernibly 'Kenyan' sound that could appeal to audiences at home and abroad – two problems Osusa had articulated as his impetus for undertaking his Nairobi City project years earlier (Nyairo and Ogude 2003).[24] In answering these concerns, the committee also followed Osusa's lead, deciding that Spotlight should cater only to musicians employing live instrumentation, and favour especially those who sought to create 'contemporary' sounds 'rooted in the country's rich musical heritage' (Alliance Française de Nairobi n.d.).[25]

Osusa worked to develop a stable of Afro-fusion artists on the Ketebul label at the same time as he was working on the Spotlight programme. The two ventures dovetailed nicely. Each brought greater visibility to the other and Spotlight brought in reliable revenue that helped to cover the costs of running a studio while the Ketebul label was in its infancy. One might expect that Osusa would have used Spotlight as a platform for recruiting Ketebul artists, but this was not the case in general. He met most of the artists who eventually signed with Ketebul outside of the Spotlight context. Even so, he preferred to sign artists who were still experimenting with their stylistic directions – artists he could mould. For example, while Ketebul artist Makadem (Charles Ademson) had already independently 'formulated a style that reflected some of the attributes of Osusa's Afro-fusion concept' before Osusa brought him on board (Morin 2012, 175), it was still nascent. Makadem and Osusa worked closely over a number of years to develop what would become Makadem's unique style that combines the driving tempo and narrative impulse of *benga* with aspects of other cosmopolitan African popular musics, such as Fela Kuti's Afro-beat and Manu Dibango's 'Soul Makossa' (Gazemba 2014; Morin 2012, 174–93).

'Modernising' tradition

The only musicians in the Ketebul stable who were directly recruited from the Spotlight programme are four female singers from Garissa in northeast Kenya who perform together under the name Gargar.[26] Gargar perform original Somali songs in traditional styles, typically involving a pentatonic melody structured in a repetitive call-and-response form. These styles are traditionally unaccompanied, but in Gargar's music they are orchestrated with a full rhythm section and some additional synthesised strings and percussion.

Gargar represented what Osusa and other members of the Spotlight steering committee came to describe as a 'traditionalist' direction for the

programme, which involved working with practitioners of rural music traditions to give their music a 'modern' twist. By 2011, the emphasis on this direction had resulted in an abandonment of the competition format, and a focus on a single region of Kenya per year. The 2011 edition of Spotlight, funded by the European Union's Non-State Actor's Program as well as Total, focused on the marginalised communities around Lake Turkana. The associated compilation album, *Spotlight on Kenyan Music Volume 5: Focus on Northern Kenya* (2012), features groups representing various ethnic communities that call the Lake Turkana region home – including Nilotic communities like the Turkana, whose musical traditions are almost purely vocal, and Cushitic communities, whose music involves instruments like guitar, oud and keyboard. But all the tracks, including those performed by Nilotic groups, are 'modernised' through the addition of a rhythm section accompaniment and meticulously arranged horn parts.

Osusa recognised the work he produced with Gargar and the featured artists on *Spotlight Volume 5* as a new kind of (Afro-)fusion, which he dubbed 'modernised traditional music', and cast it as the new direction for Ketebul. He maintained in our conversations that this new genre was potentially marketable at home and abroad, but he also made it clear that he saw it as a way to tap into new sources of patronage from institutions concerned with safeguarding cultural heritage. Notwithstanding Alliance Française's success in garnering EU support for the northern Kenya edition of *Spotlight*, there was no guarantee that modernised traditional music would bear this sort of fruit for Ketebul. But the gamble arguably made sense in light of the rapid expansion and diversification of the field of Afro-fusion since the advent of Spotlight.

By the time of my fieldwork in Nairobi in 2011, a vibrant, middle-class-oriented Afro-fusion scene had emerged in the city, with venues and audiences that extended beyond the outdoor stage of Alliance Française de Nairobi and music-loving students of the University of Nairobi. The scene was still highly dependent on patronage from international institutions, but these now included the Goethe Institut Nairobi (located within steps of Alliance Française de Nairobi) and, to a lesser extent, the British Council and various western embassies. Spotlight and Ketebul deserve some credit for the flourishing of this scene, but other individuals and institutions played important roles, as well – most significantly, the middle-class-focused music festivals like the monthly Blankets & Wine, which was founded in 2008 by entrepreneur and self-styled 'Afro-edge' artist Muthoni the Drummer Queen (Muthoni Ndonga). The Afro-fusion scene had become so expansive by 2011 that the word *fusion* had come to

be seen as passé. Most musicians in Nairobi who would have placed their music under this label just a few years earlier were adopting other 'Afro' labels, such as Afro-soul or Afro-jazz. The retention of the Afro prefix in these terms signalled a continued connection to the scene once called Afro-fusion, while the various suffixes signalled new aesthetic orientations. Thanks largely to Blankets & Wine, the terms 'Afro music' and 'Afro-based music' emerged as new short-hands for the scene as a whole.[27] This relegation of Afro-fusion to the past endangered Ketebul's status as the leading light of Kenyan popular music, potentially placing the organisation on unsure footing if and when the Spotlight programme came to an end. It was only prudent in this context for Osusa to search for a new aesthetic-entrepreneurial direction, and modernised traditional music had much to offer in this regard. By integrating ethnomusicological documentation with musical production, modernised traditional music leveraged Ketebul's uniqueness as a combined record label, production house and research outfit in order to appeal to funding organisations and institutional partners with interests in cultural preservation. It wasn't long before Ketebul found such a partner, but it wasn't UNESCO or the EU. Rather, it was a London-based record label called Abubilla Music.

Established in 2008 by Jimmy Allen, a senior director of the elite global management consultancy Bain & Company, Abubilla has always been more a labour of love than a profit-driven enterprise (Allen 2012). When Allen and others involved in Abubilla decided to embark upon a project of preserving East African musical heritage after '[travelling] through East Africa and [being] astounded by the quality of the tribal [*sic*] music' (Allen 2013), there was never any question of whether it could be done – only questions of *how*.[28] Allen's search for local partners in Kenya led him to Joyce Nyairo, who then connected him with Tabu Osusa. Ketebul had the capacity to embark on archiving work, thanks in part to Nyairo, who, in 2008, had used Ford Foundation funds to send Osusa, Bill Odidi and other Kenyan professionals involved in research and preservation of sound recordings on a visit to sound archives in Ghana, the UK, Germany and South Africa.[29]

'After several long e-mail exchanges and a few Skype calls', Abubilla and Ketebul decided to work together (Allen 2013). Allen established a non-profit wing for his label (as Osusa had done with Ketebul a few years earlier), in order to embark on the venture, which came to be called the Singing Wells project. Singing Wells involves field research on East African music traditions within and beyond the borders of Kenya, facilitated by the use of a mobile digital studio designed by Abubilla's Andy Patterson.[30] In each locale, Ketebul and Abubilla 'work with

musicians to ensure their traditions continue to be practised and can be shared with the widest audiences', while also creating new songs 'from the influence of traditional harmonies and instruments' in a parallel project 'led by musicians from the Ketebul stable' (Osusa and Odidi 2015, 181, 183). This parallel project, dubbed *Influences*, connects directly to Osusa's efforts to develop modernised traditional music. It was, of course, Osusa's idea, but it also appealed to Jimmy Allen, who, notwithstanding his use of the words *tribe* and *tribal*, approached archiving with a twenty-first-century mentality, understanding that they 'couldn't just be fossil collectors, [but also] had to work to make this music relevant and important to contemporary artists' (Allen 2013).

The aesthetic-entrepreneurial strategy of modernised traditional music carries risks, not least of which is the risk of alienating the intellectuals and middle-class elites who have supported Afro-fusion. Instead of constructing a sonic modernity that playfully transcends rural-urban and generational divides, as in the oeuvre of Nairobi City, Osusa's modernised traditional music seeks to resituate what are conceived of as pure, unadulterated traditions within a sonic modernity. This emphasis on the purity of rural traditions recalls colonial-era approaches to music and culture in Africa (Chikowero 2015, 138). As such, it stands in tension with the increasing commitment among urban middle-class Kenyans – honed in part by Osusa's own work with Nairobi City and the *Retracing* series as well as the writings of public intellectuals like Joyce Nyairo and Binyavanga Wainaina (2006, 2012) – to a postcolonial understanding of culture 'as a shifting, adaptable structure that freely borrows and incorporates from many sources over time' (Nyairo 2010a, 5).[31] Osusa has avoided a critique along these lines by building certain political commitments into his work – a situation that nicely illustrates Ana Maria Ochoa Gautier's point that efforts 'to provincialize sounds in order to ascribe them a place in the modern ecumene' (Gautier 2006, 804) are 'actually wrought with innumerable possibilities of political articulation and interpretation' (819).

Two aspects of Osusa's modernised traditional music serve to mitigate what might be seen as its problematic aspects. The first has to do with how it has engaged with marginalised Kenyan communities. In their packaging and accompanying materials, Ketebul's first modernised traditional music projects – *Spotlight Volume 5* and Gargar's *Garissa Express* (2010) – clearly frame the sounds of Kenya's northeastern pastoralists as authentic *Kenyan* expressions. As such, they challenge one of the most pernicious epistemological legacies of British settler colonialism – the idea of nomadism as a threat to national cohesion

(Broch-Due 2004, 8; Scharrer 2018; Weitzberg 2017).[32] In this way, Osusa's colonial epistemology of music (if it is fair to call it that) works in the service of an urgent *decolonial* intervention.

Osusa's modernised traditional music also resists being cast as ethically suspect through its emphasis on the agency of the artists. Before Singing Wells, this emphasis was really more aspirational than real. The artists involved in the initial modernised traditional music projects were presented as the primary creative voices, but in truth they had limited say in how their music was 'modernised'. Matthew Morin describes the Gargar recording project as a sort of experiment carried out largely by Ketebul engineer Jesse Bukindu, who spent many hours arranging each track on the DAW after the singers had laid down the primary tracks. Bukindu's process involved methodically testing out various timbres, grooves and levels of rhythmic quantisation (Morin 2012, 240–61). Morin's observations square with what I later observed of the recording and arranging sessions for *Focus on Northern Kenya*. But the Singing Wells' *Influences* series introduced a new power dynamic to Ketebul's modernised traditional music production, by removing the initial stage of the compositional process from the recording studio and resituating it 'in an environment with which the singers and dancers are completely familiar' (Osusa and Odidi, 2015, 181). The difference this has made is clear when one compares Morin's observations of the Gargar production process to the Singing Wells video of Bukindu laying down initial tracks with singer Francis Sembagare of the Birara Batwa community of Uganda.[33] In the video, Bukindu is seen playing a simple chord progression on the guitar for Sembagare to improvise over. Though Bukindu's performance is a bit hesitant – guitar is not his first instrument – he and Sembagare manage to bring together two starkly different aesthetic approaches by experimenting in a shared time and space, unmediated by either the process of 'reformatting' time within the DAW (Morin 2012, 241) or the alienating physical and symbolic barriers of the recording studio (Meintjes 2003). While the process does not eliminate underlying inequities of power between Bukindu and Sembagare, it clearly set the stage for the kind of collaborative approach to creation through which they might engage with, reflect upon and mediate those differences and inequities (Taylor 1997). In this way, Singing Wells has made Ketebul's modernised traditional music more ethically sound and, as such, more viable not only as art, but also as institutionally patronised cultural production.

Case 3: Timothy Boikwa and Still Alive

Whereas the preceding cases concern record labels that also offer production services, the final case introduces a true 'production house', whose primary business model centres on supplying clients with production services – that is, facilities and the skilled labour of a creative producer capable of composing and arranging on the DAW. Less encumbered than labels by the need to maintain a particular aesthetic identity or organisational configuration, production houses have always served as vital engines of change within Nairobi's new recording industry. While labels like Ogopa and Ketebul have established the broad parameters of the industry, production houses have provided spaces of experimentation in which its future shape – including its relationship to Nairobi's old recording industry – is constantly negotiated.

Animated by the same concern with the lack of cultural authenticity in Kenya's millennial popular musics that contributed to the emergence of Ogopa and Ketebul, the production house I discuss here, Still Alive Records, was at the time of my research experimenting boldly with crossing the aesthetic and institutional boundaries between the old and new recording industries.

Tim Boikwa is Still Alive

> *20 April 2012.* Timothy Boikwa is hunched over his computer keyboard, when a large man in a shiny silver suit calls out to his back from the doorway.
>
> '*Timo, umemaliza tracks zangu, ama?*' (Tim, have you finished my tracks?)
>
> Boikwa keeps his eyes fixed on the screen. '*Ziko*' (they're here), he answers blankly. His right hand clutches the mouse, as his left thumb and forefinger pluck out a shortcut on the computer keyboard. The 'arrange' screen of the Logic Platinum user interface – a colourful timeline of horizontally stacked rectangular boxes representing digitally-sequenced and real audio tracks – suddenly disappears, replaced by a virtual mixing board, complete with faders, buttons and knobs. He makes a quick adjustment on one of the virtual faders, before bringing back the arrange screen.

Though relatively new to Nairobi at the time of my fieldwork, Timothy Boikwa, known locally as 'Tim Still Alive', was thriving, thanks to his remarkable ability to work efficiently with a wide array of clients – including those who are typically more at home in River Road. For this ability Boikwa could thank a combination of natural-born talent, hard work and Christian charity. Recognised for his ability with the homemade box guitar when he was a young boy in Western Kenya, he received sponsorship to attend a local mission school and afterwards a music production academy in South Africa. Upon his return to Kenya in 2004 he set up a recording studio in the Rift Valley city of Eldoret. His rig at first comprised little more than an old minidisc recorder, but soon a gig producing campaign songs for Ugandan president Museveni enabled him to buy a Pentium II computer loaded with Fruity Loops and Adobe Cool Edit, a mixer, microphones and monitors.

With solid keyboard and guitar skills, and a couple of years of formal audio training under his belt, Boikwa quickly became a big fish in the small pond of Eldoret. He had constant work, with clients coming to him from as far as Western Kenya and southern Sudan to record traditional music, hip hop and everything in between. He might have stayed in Eldoret, had he not lost his home, his studio and some dear friends during the weeks of inter-ethnic violence that followed the disputed 2007 presidential election. He managed to recoup some of his losses by working as a freelance videographer for Kenyan media outlets. The money was enough for him to start over, but the Rift Valley was no longer a safe place for a Kisii man to run a business. He briefly considered moving to Tanzania, but was convinced by friends to try Nairobi instead.

While Nairobi may be the media and entertainment capital of East Africa, Boikwa discovered his particular combination of musical and technical expertise to be rare there. From my interviews and discussions with producers and artists, I have discerned three types of new-industry 'producer': (1) the 'beat maker', who can sequence inventive beats that get people on the dance floor or enable rappers to have great 'flow'; (2) the 'real musician', who can play keyboard (and possibly guitar) and harmonise melodies; and (3) the 'real engineer', who understands technical matters like spatialisation and frequency separation and can master recordings almost to an international standard (*almost*, because there are no dedicated mastering studios in Kenya). Producers who fall into one of the three subcategories while also having some skills related to one or both of the other two typically do well for themselves. Boikwa is one example: he is a 'real musician' who is also generally considered to be one of the most competent audio engineers in Nairobi.

Boikwa eventually established a proper production studio on Jogoo Road, near the Industrial Area. He set up the facility himself, down to the plexiglass window between the control room and isolation booth. The location was unattractive, and insecure after dark, but it rarely saw power rationing and as such allowed the studio to remain a hive of activity most of the day and night. He named his business Still Alive, as a reminder of what he had to be thankful for after escaping from Eldoret.

Experimenting with organisational configurations

Like most new-industry production houses in Nairobi, Still Alive operated according to a project-based model. Clients paid per song or album, rather than by the hour or day. The variably priced services at Still Alive were far less expensive than Ogopa Deejays, but more expensive than the cheapest digital studios in River Road, which charged around KES 5,000–10,000 (USD 55–110) per song. It seemed to me that Boikwa could have charged more, as his studio was always busy, with at least a couple of clients waiting to be served. He told me that there would have been even more people around every day, if he hadn't learnt to be strict about not allowing idlers. When his reputation first started to grow in Nairobi, he had long queues outside his studio door. Every young person in Nairobi wanted to be an artist, it seemed to him. He couldn't charge much at first, but he could make money and grow his business through efficiency. Since he was getting paid by the track or album, the faster he worked, the more he would make. He still endeavoured to produce quality work, in order to grow his reputation, but he learnt ways of working with the DAW to maximise the speed of a session.

Busy as he was, Boikwa was also always seeking new directions for his business. Nothing was out of bounds for him. Some of the areas he was planning on or was already moving into during my fieldwork included phonogram distribution, radio advertising, customised ringtones, video production, talent management, television pilot production and even institutionally patronised Afro-fusion. His foray into the last area, which had not yet borne fruit, stemmed from his work with a Christian singer, from Kenya's remote and troubled Turkana region, whom he hoped might find support from the UN or another NGO. Boikwa was also experimenting with new rights configurations. In a pattern I also found in other production houses in Nairobi, he was beginning to use written contracts, with royalty-sharing provisions, in his work with certain clients.

Experimenting with River Road

Of all the forms of experimentation that Boikwa engaged in during my fieldwork, the one that promised to be most consequential for the new recording industry as a whole was his experimentation with the boundary between the old and new industries. Boikwa's ability to navigate different musical styles, coupled with the speed and efficiency with which he worked, positioned him as a potential competitor to River Road studios for 'vernacular' music production. Slowly, River Road musicians like the man in the shiny suit, who turned out to be a performer of Kikuyu-language Christian music, were catching on.

> *Later in the same session:* Peering into the control room, Mr Shiny Suit offers an apologetic wave to Boikwa's current client, Luhya comedian and actor Profesa Eshuya (Thomas Oyolo). The two men scan each other's faces for recognition. They have surely crossed paths at some point – if not at Boikwa's studio then somewhere in downtown–River Road. Profesa has been thriving in the new world of 'vernacular' media that has opened up in recent years, and has produced and starred in a number of Luyha comedies made in 'Riverwood'. He and Mr Shiny Suit have almost certainly dealt with the same River Road printer or distributor at some point.
>
> Boikwa starts one of Mr Shiny Suit's songs playing in Logic and darts out of the room. As Mr Shiny Suit settles into a chair to listen to his music, Profesa leans over to talk to me. He is not just a normal client, he tells me, but a friend and collaborator of Boikwa's. He and Boikwa have undertaken various projects together, including a collection of comedic ringtones and even a pilot television show. The songs they have produced are mostly in Swahili, and set in R&B or Congolese style. But the one they are about to work on is meant to have a typical 'Luyha' sound. As we talk, Mr Shiny Suit listens intently to the playback of his own song. It sounds like a classic Kikuyu *benga* song, with a mid-tempo, four-on-the-floor beat and a simple, pentatonic melody that is first played high up on the electric guitar and then repeated throughout by Mr Shiny Suit's nasal tenor.
>
> Boikwa returns with a handful of blank CDs.
>
> '*Kitu kinazuia*' (Something is blocking), Mr Shiny Suit tells him. And then in English: 'The sound is too thin.'
>
> In one swift movement, Boikwa slides into his chair, clicks the mouse a few times and strikes a few keys on the keyboard. An interface for a synth plug-in appears over the Logic arrange screen.

Boikwa quickly tests a few string sounds by scrolling through the options in the plug-in while tapping keys on a MIDI controller keyboard that is situated on a pull-out shelf below his computer keyboard. Within seconds he is laying down a sparse synth string track as the song plays back in real time. After one verse, Boikwa halts the playback and, with a few more clicks and keystrokes, loops what he has just played until the end of the song. Finally, he smacks the spacebar to get the song playing again, checking his work.

Seeing that Boikwa still has some work to do on his tracks, Mr Shiny Suit announces that he will run to Kawangware, a large slum across town, to meet with a graphic designer.

'He is a River Road guy', Boikwa tells me once Mr Shiny Suit has gone. 'He doesn't like anything to take longer than a day. The market is ready for his album. He just needs to print the covers, then he sells them off a truck with loudspeakers, for 100 bob each. He sings a bit off key, but I've done the best I can [to fix it]. I have been getting more and more business from River Road musicians, especially the gospel guys like this one. They pay a bit more here, but for higher quality.'

Boikwa opens another of Mr Shiny Suit's songs and clicks the space bar. As it plays, he points out one of the tracks on the graphic interface. 'Listen', he says. 'That's the real River Road guitar'. He switches between the arrange and mixer screens to adjust compression and levels, then turns up the volume and sits back.

'*Hii ngoma inauzwa*' (this music sells), Profesa shouts above the playback. 'Youth music doesn't really sell', he says, leaning over toward my ear. 'Vernacular music is what sells'.

Boikwa agrees, adding over the din, 'They say in Kenya we don't really have our own sound, like they do in Uganda. But in vernacular music we do'.

As soon as Boikwa is finished with Mr Shiny Suit's material, he starts on Profesa's 'Luhya' track, beginning by listening to a scratch recording that Profesa had made with his voice on his smartphone. I have trouble hearing the melody and rhythm in Profesa's recording, but Boikwa manages. He spins around toward his DAW set-up and pulls the draw with the (musical) keyboard toward his chest. Soon a metronome click is blasting through the monitors, and Profesa is singing his song to Boikwa's back. With a few practised strokes of the keys, Boikwa creates a funky, Congolese-style snare-drum groove grounded in the Afro-Caribbean clave pattern. As that continues to play, Boikwa switches to a synth sound and begins

piecing together an introduction with some stop-time figures. Soon he is adding more synth parts, and within minutes the introduction has taken shape. Boikwa then fills in the rest of the drum groove and adds synth chords, looping everything forward for about five minutes (he will cut it down to the right length later).

As Boikwa works on additional MIDI tracks, the track plays and plays. All the while, Profesa continues singing, talk-singing, and dancing behind him. The process is surprisingly linear and remarkably efficient. By adding small variations as he goes, Boikwa gives the song a sense of form. Such variations could be added later, but Boikwa saves himself the trouble by taking care of it on the fly.

After adding the MIDI bass track, Boikwa picks up his electric guitar. He doesn't need much practice to find the right riffs – just a few starts and stops. A couple of guitar tracks later, all the instrumental tracks have been added.

Devoid of vocals, the song sounds generically Congolese, with high, melodic guitar lines skating over a syncopated snare drum groove.

'This kind of music is easier to sell [than youth music]', says Boikwa as we all listen back to his work. 'In villages, and even in Nairobi'.

As the playback comes to an end, Profesa announces, 'Ready for River Road!' It is meant as a respectful and ironic jibe at Boikwa, who is one of the few new-industry producers who can actually keep up with the rush-rush approach of Mr Shiny Suit and his ilk. But it also expresses an aspiration, and a degree of respect for the mavens of the old recording industry, who, at the end of the day, are the ones who really know how to sell music.

I have presented this ethnographic snapshot in order to convey something of the effortlessness with which Boikwa traversed the social and aesthetic boundaries between the old and new recording industries. For Boikwa River Road still stood as the constituent outside of the new recording industry in which he and his organisation were situated. But it was an outside that seeped into his work, not only conceptually (providing both a positive and a negative model) but also materially, with the advent of a new clientele. Far more than Ogopa or Ketebul, Still Alive provided a space in which the two industries could be seen to coalesce.

Conclusion

I have presented three examples of how aesthetic entrepreneurship has shaped Nairobi's new recording industry. In each one we find the same basic process, which Born (2011, 2012) describes as the essence of genre. In abstract terms, this process involves a temporal 'projection' of a musically 'coded' representation of a social collectivity 'into the cauldron of evolving social identity formations', with the aim of '[effecting] either the reproduction of identity formations, or a redirection or novel coalition of such formations' (Born 2012, 270). More concretely in these cases, it involves an aesthetic project of (re)inserting some projected or imagined version of Kenyan identity into Kenya's postmillennial popular music. But for all their striking similarities, the three studies describe three distinct aesthetic-entrepreneurial ventures, each operating in a different stylistic arena within the broader realm of Kenyan postmillennial popular music, and each resulting in a different type of organisation (commercial label, non-profit label and production house). As such, they give a sense of the diverse ways in which this industry has taken shape, and continues to take shape, in the absence of corporate record labels. The result, I hope, is a 'non-teleological' (Born 2012, 264) account of the industry that avoids positing a particular direction for its development. A number of scholars have called for such an approach to non-western music industries in recent years (Born 2012; Ochoa and Botero 2009; Perullo 2011; Stokes 2002). But the impetus for my approach does not come only from scholarly literatures. My conversations with my interlocutors in Nairobi's new recording industry have convinced me that it is only by asking how the industry is pieced together that we can begin to ask how it works, and how it might work better for those whose livelihoods depend upon it.

Notes

1 For a detailed portrait of Juliani and his work see Ntarangwi (2016).

2 As with the similar situations in the US and Europe (Wolfe 2012), there is no simple explanation for why nearly all producers in Nairobi's new recording industry have been men. Some of my interlocutors in Nairobi proposed insightful theories. Suzanne Gachukia suggested that it may have to do with the 'stigma' attached to women in music in Kenya (recorded interview, 3 May, 2012), while Thomas Mahondo of the label Calif Records suggested that it is probably related to the fact that young men in Kenya gravitate toward informal work while companies are more likely to hire women for office jobs (recorded interview, 8 August, 2012).

3 The connection between Born's theory of musical genre and social constructionist approaches to entrepreneurship makes sense, as the latter were developed through empirical research in environments of 'extreme uncertainty' (Sarasvathy 2008). There is hardly anything more riven with uncertainty than musicians' attempts to connect with audiences (Negus 1998).

4 The term *vernacular* has been used in Kenya since the British colonial era to mean Kenya's African languages with the exception of Swahili, which was used as an administrative language by the British and took on the status of a national language after Independence. It is a problematic term, which I employ here only because of its local salience. Ngũgĩ wa Thiong'o (1981, 59) places its origin in the racist discourses of settler-colonisers, who 'believed that the English language was holy' and 'despised peasant languages which [they] termed vernacular, meaning the languages of slaves'. Though still freighted with ideas about the inferiority of African ways of being (Mũkoma wa Ngũgĩ 2018), *vernacular* can also carry neutral or even positive connotations in certain contexts in Kenya today (Gathigi 2009, 4–7). Since the first decade of the twenty-first century, it has become unavoidable when speaking about the media environment and cultural production in the country, due to the rise of FM radio stations and television stations broadcasting in Kenyan African languages other than Swahili, and the emergence of a local film industry oriented toward speakers of those same languages. While the new film industry is often termed 'local' – or, more playfully, 'Riverwood', because it is centred alongside the old music recording industry in downtown–River Road – the new media channels are generally termed 'vernacular', even in official contexts such as reports by the Media Council of Kenya. This has served to solidify the use of the term *vernacular* in the realm of music, as well.

5 Tedd Josiah's set-up at Sync Sounds included an Atari ST computer running Cubase. Because of its expense, there were few such systems in Nairobi, all purchased by businesses rather than individuals.

6 David Muriithi, recorded interview, 27 November 2011.

7 Robert Kamanzi, recorded interview, 19 January 2010.

8 Jaaz Odongo, recorded interview, 22 March 2012.

9 Reflecting the urgency of this concern in the early years of Kenyan postmillennial popular music, Michael Wanguhu employed musical colonisation as the organising theme of his 2007 documentary on Kenyan hip hop.

10 One could also talk about the 'indigenization' of hip hop and related forms in Kenya during the 1990s, including their adaptation into local languages, as 'vernacularization' (see Mitchell 2000).

11 In 2012, Ogopa was charging upwards of 40,000 Kenyan shillings (around $600) to produce a single audio track.

12 Lucas Bikedo, recorded interview 7 August 2012.

13 Viola Karuri, recorded interview 30 July 2012.

14 Founded in the UK in 1985, *Sound on Sound* began posting content on the internet in 1994.

15 *Bashment* is another term for dancehall music in Jamaica.

16 Both songs were ultimately released on Chameleone's album *Mama Mia* (2001).

17 As Marshall notes, the same is true for a recording industry that depends largely on album sales (such as the Euro-American industry for much of its existence), but for slightly different reasons.

18 Gérard Saby, email communication, 10 April 2019.

19 Tabu Osusa, recorded interview, 23 July 2011.

20 Iddi Achieng', recorded interview, 27 June 2012.

21 A search of the Ford Foundation's online grants database in 2013 revealed around $450,000 in funding afforded to Ketebul in three tranches. These results are no longer retrievable at the time of writing.

22 I assisted with Ketebul's research in small ways during my fieldwork in Nairobi, and later contributed a chapter on Swahili *taarab* music for their tome on Kenyan popular music, *Shades of Benga* (Ketebul Music 2017).

23 All recording and mixing for Spotlight-related recording projects took place at Ketebul. Postproduction (mastering) was outsourced to a studio in France, there being no studios in Kenya that could master audio according to international standards and specifications.

24 Harsita Waters, recorded interview, 30 September 2011.

25 Harsita Waters, recorded interview, 30 September 2011.

26 The members are Bashir Muge, Anab Gure Ibrtahi, Amina Basher Elmoge and Asha Ibrahim Yussuf.

27 Early on, the Blankets & Wine organisation used 'Afro fusion music' (unhyphenated) interchangeably with 'Afro-based music' (Blankets & Wine n.d.). But they ultimately settled on the latter.

28 Allen's use of the word *tribal* here deserves a *sic*. It stands at odds not only with contemporary scholarly discourse, but also with how his collaborators at Ketebul speak and write about ethnicity and culture in Kenya (see Osusa and Odidi 2015).

29 The other participants in this trip were 'drawn from key institutions like the Kenya National Museum and the Kenya National Archives' (Osusa and Odidi 2015, 176).

30 All Singing Wells outputs and associated reports are available through the project website, http://www.singingwells.org/. Accessed 9 January 2022.

31 The popularity of Binyavanga Wainaina's *How to Write About Africa* (2006), a satire of hoary Africanist tropes 'such as "Timeless". "Primordial" and "Tribal"', speaks to the strength of this commitment. Originally published in the literary magazine *Granta*, it was reprinted in Kenya in a slim volume that was available for purchase at local bookstores as well as middle-class-oriented literary and musical events during my fieldwork in Nairobi (Wainaina 2008). The essay seemed to me to have been read by every middle-class Nairobian I met during my fieldwork in 2011 and 2012.

32 In addition to bearing a title with a Kenyan placename, the cover of Gargar's *Garissa Express* shows an image of a half-peeled sticker reading 'Music from Kenya' over a corner of the band's name.

33 The video, posted in 2012 on the Singing Wells project channel, is found at https://www.youtube.com/watch?v=c1XBVlNQL6E. Accessed 9 January 2022.

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3
'In the waiting room': digitisation and post-neoliberalism in Buenos Aires' independent music sector

Geoff Baker

This chapter analyses the independent music sector in Buenos Aires in the wake of two major developments of the 1990s and early 2000s, digitisation and the national economic crisis of 2001, drawing primarily on fieldwork in 2011–13. The first section outlines the Buenos Aires music industry, focusing on independent labels and artists, and exploring the relative fortunes of the digital content and live music sectors. The second section takes as a case study a small label, ZZK Records, and the genre around which it coalesced, digital *cumbia*, examining the label's changing relationship to digital technology and its economic strategies. Other strands of digital *cumbia* production are also considered. The final section explores the role of the state in the field of digitisation and culture. Alongside digitisation, Argentina saw a political transition to centre-left populist governments, and the two became increasingly entwined. The Kirchner governments (2003–15) saw new policies aimed at supporting the independent music sector and, more broadly, the emergence of a post-neoliberal paradigm for the cultural industries that sought to catalyse progressive alternatives to digital capitalism. An ethos of collectivism arose in response to the opportunities and challenges provided by digitisation and post-crisis economic realities. Many related developments came to an abrupt halt with the election of the centre-right candidate Mauricio Macri as president in late 2015.

Introduction

From the turn of the millennium, Buenos Aires emerged as a major centre of electronic dance music (EDM) in Latin America. As well as constituting an important regional hub for international EDM, it was also at the heart of the creation of new styles that reinvented traditional Latin American genres by incorporating digital technology and aesthetics. Argentinean laptop artist-producers mixed Latin American and Caribbean popular and folk musics with electronic genres like techno, dub, dubstep and dancehall to create new hybrid styles – first electro-tango (around 2000) and subsequently digital *cumbia* and digital folklore. Among the main driving forces that fostered the latter genres and propelled them to the global stage was the Buenos Aires label ZZK Records, internationally recognised as an important creative force in contemporary Latin American electronic music.

I was drawn to this area for a number of reasons. *Cumbia*, a genre of Colombian origin that spread across the Americas in the mid-twentieth century, had until recently been somewhat underrepresented in the academic literature, considering its significance in the region.[1] It had been an important feature of working-class musical life in Argentina for some fifty years, and while Argentinean sociologists had paid considerable attention to *cumbia villera*, with its intimate connection to the neoliberal 1990s and subsequent economic crisis, the music's more recent incorporation and transformation by middle-class laptop producers in Buenos Aires and the emergence of a middle-class *cumbia* scene had attracted minimal academic attention.[2] These developments seemed worthy of further study, since they pointed to a new phase in the history of this genre, one connected to wider changes in Argentina since the turn of the millennium. The country's decade of neoliberal capitalism, the 1990s, culminated in a catastrophic economic crisis in 2001, ushering in the centre-left Peronist governments of Néstor Kirchner (2003–7) and Cristina Fernández de Kirchner (2007–15). One consequence of the crisis and subsequent turn to nationalist and regionalist politics was increasing identification with Latin America on the part of a middle class that, in Buenos Aires at least, had long been famed for its Europhilia. This significant socio-political transformation was felt in the musical sphere. Rock had exercised a considerable hold over Argentinean audiences since the 1960s: Argentina was a pioneer in the development of *rock en español* in Latin America and is frequently described in middle-class circles as 'a rock country'. Yet while rock retained considerable popularity, national

folkloric musics and internationally circulating Latin American genres such as *cumbia* were gaining increasing visibility among the middle and upper classes (Sánchez 2014). Digital *cumbia* and folklore thus spoke of wider social, political and cultural transformations, and with ZZK Records foregrounding the digital at the level of both musical aesthetics and institutional self-presentation, this label and its genres were potentially fertile terrain for studying the nexus between music, politics and new technologies.

For all the increasing legitimation of *cumbia*, however, ZZK's music was largely divorced from the mainstream *cumbia* or 'tropical music' scene in Buenos Aires, which was dominated by the 'popular' (that is to say working and lower-middle) classes. ZZK was tied more closely to the middle-class indie rock and alternative EDM scenes, illustrating that class divisions subsumed genre connections. During 2011 laptop *cumbia* became established in the commercial *cumbia* scene, due above all to the huge success of the boy band Los Wachiturros, which spawned many imitators and rivals, and a new subgenre – *música turra*. However, it was emblematic of Buenos Aires' class and geographical divides that these distinctive strands of digital *cumbia* barely intersected. This study thus focuses primarily on a niche of middle-class, independent musicians and labels rather than the *cumbia* mainstream, though it also considers *música turra*.[3]

Examining these actors provided insights into the fortunes of a sector of the music industry under digital conditions. The music industry suffered heavily in the aftermath of the 2001 crisis, and while it soon began to recover, it was then subject to many of the challenges experienced at global level with the explosion of internet access. Nevertheless, there were also important continuities: for example, the multinational major labels, long established in Argentina, continued to control over 80 per cent of the record market, and concerts by middle-aged rock stars from the global North filled stadiums. A focus on ZZK Records and related artists sheds light on the uncertain place for independent musicians and new technologies in this picture.

From the start, ZZK's outlook was global. It was co-founded by Grant C. Dull, a North American who had previously created What's Up Buenos Aires, an English-language internet portal for the Buenos Aires cultural scene, and it particularly caught the attention of expats, hip tourists and foreign journalists. Its early and enthusiastic adoption of social media and its aesthetic orientation towards fusions with internationally circulating forms of EDM resulted in prominent participation in the transnational networks of Global (or Tropical) Bass,

the digital, club-oriented offspring of World Music (though over time its orientation shifted towards the parent genre). ZZK's artists toured regularly to Europe and the US, and collaborated with producers overseas, and the label signed a licensing deal with Los Angeles label Waxploitation in 2011. ZZK Records was thus a thoroughly, and at times frantically, transnational operation.

As ZZK's centre of attention shifted ever more towards Europe and North America, it became less rooted in the local music scene. In many respects, five years after its foundation ZZK could have been located in Bogotá, Brooklyn or Barcelona, and its location was arguably wherever Grant Dull's laptop happened to be. In order to explore wider issues surrounding music and digitisation that were more specific to Buenos Aires, I therefore broadened my research to encompass developments in cultural and digital policy at municipal, national and continental levels. The Ministry of Culture launched several new initiatives centred on digital transformations and the cultural industries, and seemed set on playing a larger and more supportive role in the independent music sector. Once again, transnationalism was to the fore, and these shifting visions and policies must be understood in the context of the marked Latin American regionalism of the early twenty-first century. While many such initiatives were ultimately abortive, they signalled important shifts in the conceptualisation of the relationship between politics, culture and the digital, on the part of the Argentinean government and of the Latin American Left more generally.

The Buenos Aires music industry in the digital era

According to a report by the Observatorio de Industrias Creativas (OIC) in 2011, the Buenos Aires music industry represented a successful sector of the economy, with its total income having almost doubled between 2005 and 2009 ('La Industria de la Música' 2011). The principal reason for this success was live music, which grew by nearly 300 per cent in that period. These statistics contrasted, however, with a more uneven picture emanating from the city's independent music scenes. On 4 June 2012, the Club Cultural Matienzo hosted a debate on the topic: 'From underground to indie: industry and venues in the waiting room', which provided a snapshot of the independent music sector at the time. Participants complained of small audiences, a lack of venues and meagre earnings. The alleged cause of this difficult situation was new technologies: the internet was seen as a rival to live music, responsible for an excess of

music and a dearth of audiences. One older musician quipped that if his generation wanted to hear music and meet girls, they used to go to gigs; now people stayed at home with YouTube and chat. The messages conveyed by the panellists were: work hard, lower your expectations and question whether you are good enough. It was hard to imagine that the audience went away with renewed hope.

A closer reading of the OIC report reveals two important findings that support the more negative mood seen at the debate. First, the growth of live music covered up a big drop in the sales of physical formats, yet the drop had not been offset by rising digital sales, which accounted for just 7 per cent of total music sales in 2009, compared to a Latin American average of 15 per cent ('La Industria de la Música' 2011, 45–6). The report concluded that 'the digital market is not being consolidated in Argentina' (2011, 42). Furthermore, the limited digital sales were concentrated among overseas consumers and fans of Top Ten artists, meaning there was almost no local digital market for independent music.

Digital distribution initiatives by Argentine record and telecoms companies had been broadly unsuccessful. There had been several attempts to launch portals, from 2005 to 2007, but none had prospered and some had closed again. There were six portals active in 2010, but the number of users appeared to be low. The failure of Zap Música, launched in 2005, was emblematic: despite major investment from the cable company Fibertel, the portal achieved only derisory sales (never exceeding $400 a month). The mobile music market was also slow to take off in Argentina and, at least initially, had a negligible effect on the independent music sphere, since mobile phone operators focused on selling a small range of current hits. iTunes launched in Argentina in 2011, but only 0.5 per cent of the population used it in 2013 ('Encuesta Nacional' 2013).

With the pay-per-download model showing few signs of promise, commercial attention shifted to streaming. Multinational services Grooveshark and Deezer launched in Argentina and 2012 saw the creation of the Buenos Aires-based Taringa! Música. Its parent company, Taringa!, founded in 2005, was not only a highly successful social network but a prime source of links to free downloads of music, films and books and the first stop for music producers in search of pirated software, samples and plug-ins. Initially seen as a local equivalent of Megaupload, the Hong Kong-based file hosting service shut down by the FBI in 2012, it went through a tortuous legal process for several years from 2009. Its owners, the brothers Matías and Hernán Botbol and Alberto Nakayama, were committed for trial in 2012, charged with violating Argentina's

intellectual property law by facilitating copyright infringement ('Confirman juicio oral' 2012). This was to be the first public trial in Argentina in which the responsibility of websites for the illegal actions of their end users would be debated, and Taringa! became a focal point for local debates about IP.

As part of efforts to legitimise its activities under the shadow of the impending trial, the company launched Taringa! Música, a legal streaming service. In 2012–13, it negotiated with multinational major labels, and trade and collecting societies, principally SADAIC (Argentinean Society of Authors and Music Composers) and CAPIF (Argentinean Chamber of Phonogram and Videogram Producers), and now described its aim as to become the Spotify of the Spanish-speaking world. The possibility that Taringa! Música might offer a radical alternative to the commercial digital distribution platforms of the global North receded as it backed off from a 'free culture'-esque stance under pressure to deal with major industry and legal institutions. By September 2013 Taringa!'s counter-cultural discourse had all but vanished: Hernán Botbol described a company that had attempted to respect IP norms and deal with complaints from rights holders while operating in an ill-defined legislative context, and had been unfairly treated by publishers.[4]

Late 2013 also saw a major blow for Taringa! Música – the arrival of Spotify in Argentina. While the Argentinean company had been embroiled in drawn-out negotiations, it had been outflanked by an international competitor and its moment had passed. Features of Taringa! Música that had been innovative when it was conceived were now commonplace on multinational services like Spotify and SoundCloud, and a combination of Argentinean fascination with foreign trends and the negative associations of the Taringa! brand put the local alternative at a disadvantage. Furthermore, Taringa!'s directors, observing the finances of multinational services, became less convinced by the idea of music streaming as an economic venture. With Taringa! Música just one part of a larger enterprise, and a problematic one at that, the directors shifted their attention to other areas, redesigning the portal as a source of information for news media. Taringa!'s attempts to improve its image had been largely successful – by agreeing to publishers' demands, it had ensured that the legal case against it was all but dropped ('Otro querellante' 2014) – but the sense that its music service might challenge multinational enterprises had passed. In 2013, only 3.8 per cent of the population used it to listen to or download music, compared to 27.5 per cent for the peer-to-peer service Ares and 14.4 per cent for YouTube ('Encuesta Nacional' 2013). With none of these services generating direct

income for independent musicians, there was no immediate sign that digitised music would provide a financial lifeline to the independent music sector.

The second important finding of the OIC report was that 80 per cent of live Argentine music revenue came from stadium concerts. The local music industry thus depended heavily on big-name acts, particularly international stars. Accounting for 90 per cent of the concert promotion market in 2012, the promotion and production companies T4F-Time for Fun, Fénix and Pop Art – rather than digital content providers – emerged as the primary actors of the music industry in the digital era ('El background' 2012). Many large concerts were sponsored by major brands and the early 2000s saw the rise of sponsored festivals such as Pepsi Music Festival (originally Quilmes Rock, founded in 2003) and Personal Fest (from 2004). The music industry boom thus exemplified the continuing concentration and corporatisation of the cultural industries, a process noted in the 1980s (Hesmondhalgh 2012) that has only intensified under digital conditions. In Argentina, as in the global North (Netto 2012), music was generating capital at an industry level above even that of the multinational major labels, with its value now lying primarily in its capacity to sell the products and services of the consumer electronics and telecoms industries.

The propitious local conditions for international rock stars were highlighted when Roger Waters sold 372,550 tickets for nine shows as part of his 'The Wall Live' tour, making the River Plate football stadium the second most important open-air venue in the world in 2012 from the perspective of ticket sales (Kantor 2013). Waters personally earned $15.7 million, illustrating how Buenos Aires' '2.0' music industry was primarily benefitting the same musicians who thrived under the '1.0' version, with profits concentrating at the top end of the live music industry. The digital era saw Buenos Aires experiencing a form of rock imperialism from the global North, boosted by the recession in Europe ('El background' 2012). Argentina's large rock fan base provided a receptive audience: 'The high demand for tickets makes Buenos Aires one of the most important markets on the planet', claimed Waters' agent (Kantor 2013).

This was a promising picture for transnational corporations and international stars, but less so for local independent musicians. Indeed, the OIC report noted 'impoverishment of the local, alternative scene' ('La Industria de la Música' 2011, 47) as fans' expenditure was drawn away from mid-level local artists in favour of international touring acts. Exacerbating the problem was a shortage of suitable small- and medium-sized venues, after a fire at the nightclub República Cromañón in 2004,

which killed nearly 200 people, led the city government to close locales and tighten licensing practices. A decade after the tragedy, the city government continued to shut down small-scale cultural centres.[5] Independent musicians and promoters lamented the lack of performance spaces, the bureaucratic hurdles to creating new ones, the prevalence of shady practices in existing ones, and the struggles simply to break even (see also Totah 2014). One, DJ Relo, explained how he had founded Sub Klub netlabel as a response to the declining opportunities for live events; the internet provided an alternative outlet for his musical energies and an escape from the problems of the urban environment. Independent musicians thus found themselves in a double bind: declining sales of recordings raised the importance of live performance, yet the urban infrastructure and restrictive regulations conspired against it.

Independent labels were unsurprisingly downbeat in their outlook. Their problems were a decade old, to judge from an OIC report in 2004 that asked: 'How do small and medium independent labels survive, if even in an optimistic scenario the profits made from recording and releasing records are practically nil?' ('La industria del disco' 2004, 74). The first answer was that many labels had not survived. Those that had were increasingly distancing themselves from content creation, tending more towards licensing existing music. At a debate at the cultural industries trade fair MICA in 2013, one label owner proposed dropping the first word in the term 'record label', since labels rarely made records anymore. Another claimed that small labels were increasingly operating as a service industry, offering distribution to musicians for a fixed fee; some did not even have their own catalogue. He suggested that there was little investment in music at any level of the industry since it was simply no longer profitable to produce music in a studio.

If digital optimists have argued that the internet is democratising the cultural industries (see Hesmondhalgh 2012, 313–21), these independent label owners were more sceptical, pointing to their straitened circumstances and those of their musicians. One asked rhetorically: 'Who is going to protect us in this monstrous digital world, abandoned to the market as it is, perhaps more so than the record industry ever was?' Nicolás Falcoff, owner of the independent label Sura, claimed that there was 'a hyper concentration, a hyper monopolisation hiding behind the curtain of the democratisation of content on the internet'. Major corporations were profiting handsomely while 'those who are losing the battle are the content producers'. He described corporations as acting like parasites on cultural producers rather than investing revenues back into new production, resulting in the concentration of profits – a view echoed

by academic reports on the global industry (for example Leurdijk and Nieuwenhuis 2012, 10). The evidence from Buenos Aires that revenue was not trickling back down to the independent music sector in a consistent way was echoed elsewhere: Solís (2010) reports a similar scenario in Santiago de Chile, while the Digital Music Report (2011, 22), describing 'the squeeze on the smaller players' around the world, provides a downbeat picture of losses and declining investment in artists on the part of labels in the UK and Mexico as well as Argentina.

The production of stasis in the Buenos Aires music economy

According to the Club Cultural Matienzo debate, the independent industry was 'in the waiting room' – a phrase that captures the sense of inertia and uncertainty in the sector at that time. One factor behind this stasis was the slow development of a digital music economy in Argentina. This in turn relates to the lack of credit card penetration and confidence in online transactions, in part a consequence of the central role of banks in the 2001 crisis and thus a limited culture of e-commerce. Moreover, not least thanks to Taringa!, there was a deeply rooted culture of free downloading, which was considered 'cool', according to Zap Música's former director: 'Buying in Zap Música was not cool. You were stupid if you bought it, because you could go to many sites and download it for free. So why pay?' The culture of internet use in Buenos Aires combined widespread access and high technological literacy with a disinterest in paying for digital content and pervasive 'free culture' practices. In 2012, the US-based International Intellectual Property Alliance (IIPA) painted a picture of high rates of piracy and low enforcement, and kept Argentina on its Priority Watch List (Argentina 2012). The IP activist Lila Pagola (2010, 40) wrote: 'We are copyleft *avant la lettre*, simply because if there were not a generalized practice of unauthorized copying and peer-to-peer sharing, the majority of us would not have access to cultural goods.'

While Argentineans' reluctance to buy digital content dampened optimism about the future of digital distribution, institutional forces must also be taken into account. The multinational major labels, the local collecting and trade societies SADAIC, CAPIF and AADI (the Argentinean Association of Performers) and the mainstream media formed a close and collusive bloc which had historically exerted a strong hold over the music industry. Many interlocutors traced the stasis in the digital music field to the attitudes and actions of these dominant players, which were widely regarded as having taken a conservative line with regard to emerging digital conditions: slow to react and fighting to defend their territory

rather than adapting.

During the 1990s, the majors bought up large independent labels, as they did across Latin America (Ochoa and Yudice 2002; 'Valor y símbolo' 2010, 86). According to the OIC's 2004 report, the majors had 82.6 per cent of the national market, giving Argentina the second highest penetration of foreign capital in Latin America ('La industria del disco' 2004, 46). In 2010 the majors had 80 per cent of the record market and 90 per cent of the top-selling albums in Argentina ('Valor y símbolo' 2010). In the early 2000s, however, the majors streamlined their operations in Latin America (Laing 2009, 23). The 2004 report claimed that the major labels had suspended their research and development of new artists and were focusing on promoting a small number of long-established figures. The majors thus fostered a rigid and conservative star system, making opportunities for new entrants scarce. In Argentina, as elsewhere (Elavsky 2013, 105–6; Leurdijk and Nieuwenhuis 2012, 46), less famous national artists took the brunt of cutbacks as the majors reduced investment and focused on marketing global priority artists. In one analysis, a combination of the domination of the majors and the abandonment of policies in support of local industries during the neoliberal wave of the 1980s and 90s impeded the development of the Latin American music industry (Barrowclough and Kozul-Wright 2011, 21; Cunningham et al. 2011, 75). In the early 2000s, I would argue, the majors' simultaneous strength (in terms of market share) and weakness (in terms of the general decline of the recording industry) led them to take a cautious line, producing retrenchment rather than dynamic new developments. By 2012 the major record companies' Argentinean offices were increasingly diversifying into 'new business', negotiating with streaming services, concert producers and brands and transforming themselves into content and entertainment companies. Nevertheless, due to their earlier recalcitrance, they were still widely perceived as a conservative force.

Founded in 1936 and 1958 respectively, SADAIC and CAPIF, too, were commonly viewed as sources of inertia, resisting attempts to reshape intellectual property policies for the digital era and labouring over negotiations with digital initiatives such as Taringa! Música. SADAIC was commonly described as a conservative institution run by elderly men – 'a white elephant' with 'a very analogue way of thinking', in the words of one senior industry figure. The same individual said of AADI: 'I talk about digital to them, and they make a very big effort, but they don't get it. They don't use it, so they don't get it.' A state cultural official described these institutions as 'the analogue sector', claiming that they made little effort

to grasp how digitisation was reshaping the cultural sphere.

Relations between the major labels and the collecting and trade societies were tight: the majors dominated CAPIF (Lamacchia 2012, 142–4), while SADAIC's opaque and much criticised formula for dividing up royalty income was said to favour the multinationals. The majors also had privileged access to the mainstream media, which continued to be important in Argentina (Becerra, Marino and Mastrini 2012, 18; 'La industria del disco' 2004, 29). Radio play was still key to music consumption ('Encuesta nacional' 2013) and industry success, and independent musicians claimed that payola was rife, making it hard for them to gain exposure. While the 2009 media law (Ley de Servicios de Comunicación Audiovisual) was supposed to redress this balance by stipulating a quota for local independent music, the digital era had not yet seen a significant shake-up of the main players of the Argentinean recorded music industry, whose continuing collusive dominance left limited space for innovation.

If the institutional panorama was dominated by defensive, analogue-era organisations, institutional and political divisions also contributed to the production of stasis. The national and municipal cultural industries offices were run by opposing political parties and pursued divergent policies, while the major labels had limited connections with these offices and the independent sector. The majors operated to a significant degree as a separate sphere, their institutional line and much of their catalogue determined overseas. Such was the separation between the majors and the rest in neighbouring Brazil that Howard-Spink (2006) argued that there were effectively two recording industries. In sum, Buenos Aires sustained a fragmented and contested music sector, and as the fate of Zap Música and Taringa! Música confirmed, this was an unpropitious setting for aspirant digital music entrepreneurs.

ZZK Records and digital *cumbias*

ZZK Records, founded by Grant C. Dull, Diego Bulacio (aka Villa Diamante) and Guillermo Canale (aka DJ Nim), began life in 2006 as a weekly club night, coalesced into a label in 2008 and by 2011 had evolved into an integrated management and production company housing nine artists plus the three founder-DJs. Its parties brought together laptop artists interested in fusing Latin American musics with international genres like techno, dancehall and dub. It coined the term 'digital *cumbia*' for its signature sound, an EDM-tinged version of the Colombian genre

adopted by Argentina; but a number of ZZK artists showed equal or greater affinity for Argentinean folkloric musics.

ZZK's artists had considerable interest in national and continental traditions, yet they and their audiences were primarily middle- to upper-middle-class cosmopolitans with a notable orientation towards the global North. The scene that coalesced around them amounted to a 'culture of circulation' (Baker 2015a; Lee and LiPuma 2002). Two of its foundational figures were a Dutch conceptual artist and musician, Dick Verdult aka Dick el Demasiado, and a North American DJ, Gavin Burnett aka Oro11. Dick el Demasiado's Festicumex (Festival of Experimental *Cumbias*) in 2003 was a prime catalyst, and Burnett, who spent an extended period in Buenos Aires in the early 2000s, further opened the ears of upper-middle-class tastemakers to fusions of *cumbia* with hip hop, dub and reggae. ZZK cofounder and manager Grant Dull had previously cofounded the website What's Up Buenos Aires (WUBA), aimed at connecting foreign audiences with the Buenos Aires cultural sphere. The scene was thus initiated by the circulation of foreign musicians through Buenos Aires, consolidated by a North American cultural entrepreneur and 'ignored by most locals but eagerly embraced by first-world expats living in Buenos Aires'.[6]

I was originally attracted to study ZZK Records because of its international renown but also because it seemed to embody a cutting-edge, distinctively digital enterprise. Like many ethnographers of the digital, I faced fundamental challenges when I began fieldwork, such as where and what to study. ZZK artists played prestigious festivals and the label was covered by international media outlets, yet its impressive web presence contrasted with a local operation that consisted largely of Dull, his assistant Allie Silver, and their laptops. For much of my fieldwork ZZK did not have an office and work often took place in living rooms, bedrooms and cafés. Dull would spend much of his day networking digitally with the outside world – writing and answering emails and posting news, videos and music on social media. As a result, ZZK and its technologically savvy musicians became a key point of reference for the transnational Global Bass scene. Paradoxically, though, their local presence in Buenos Aires was far more modest.

Digital *cumbia* was more coherent on the internet than in the offline world. Emerging from different points in Latin America in the early 2000s, its central nodes became Facebook or SoundCloud groups like 'The New *Cumbia* Makers' and blogs like 'Generation Bass', 'Nu *Cumbia* Experience' and 'Cassette Blog'.[7] If more traditional forms of *cumbia* were the soundtrack to countless large dances every weekend, digital *cumbia* was

surprisingly elusive on the streets of Latin American cities and primarily inhabited online spaces.

ZZK was indeed a highly digital enterprise in 2011–12. It had a colourful website and its artists were assiduous users of social media.[8] They made mixtapes – consisting of their own unreleased tracks, their remixes of other artists' work and others' remixes of theirs – which the label distributed for free on its website.[9] As well as disseminating current information, Dull often filled quiet news days with retrospective posts – old videos of key performances from the past, for example – thereby constructing and reinforcing a sense of institutional history. Though remaining a niche label, ZZK created a transnational fan base via the internet and its artists communicated extensively with listeners and other producers, both locally and overseas. While Buenos Aires' musical culture has been notably transnational for centuries, its circulatory flows and international profile were much intensified by the internet.

At the same time, with industry developments moving fast, I was obliged to reconsider my initial premise about ZZK's distinctiveness. It might have been an accurate assessment earlier in ZZK's history: Dull had contacts and a knowledge of social media that helped bring ZZK's parties and then the label to international prominence in its first phase. But by 2012, to describe ZZK as a distinctively digital enterprise seemed increasingly meaningless. After the rapid international spread of a handful of dominant platforms, there was now little that distinguished ZZK's digital tools and strategy from those of myriad other independent labels, both locally and overseas. The intensification of circulation enabled *by* the web promoted certain kinds of standardisation *on* the web, which was further reinforced by the proliferation of homogenised, user-friendly internet tools; online presentations of self were thus increasingly similar.

What was striking about ZZK by 2012 was less its digital practices than the fact that its artists were starting to turn away from their original one-man-and-his-laptop formula and instead constitute ensembles, incorporate 'real' instruments and play down sampling. By this point, with digital technology now so commonplace in Buenos Aires, what was distinctive about ZZK was less a digital ethos than a post-digital one (Baker 2015b). The prefix 'post-' signifies modification, self-reflexivity and critique rather than rupture, since digital technology continued to be widely used. If there was a temporal aspect, it described a putative moment after digital saturation, a state of affairs evoked by Villa Diamante's 2009 mash-up album *Empacho digital* (Digital indigestion).

Most of ZZK's artists came from an EDM background and in ZZK's

earlier phases, the digital had played an important role in mediating *cumbia* for the upper-middle class, who had historically viewed this genre as vulgar for its strong association with the 'popular' classes. Digital fusion enacted a class move, making this music not just acceptable but positively hip. However, as *cumbia* gained space among the middle classes, a process that accelerated with the appearance of middle-class 'traditional' *cumbia* orchestras from around 2009, several ZZK artists began to see their music-making as a personal journey into Latin American traditions, one that involved more sparing or self-critical use of new technologies and deeper engagement with old ones. Consequently, the laptop lost some ground to traditional instruments and a more conspicuously live aesthetic. Whereas in the peripheral Mexican city of Tijuana, the digital fusion musicians of the Nortec Collective aspired to modernity and cosmopolitanism (Madrid 2008), ZZK's artists were based in a capital city that had long been one of the most modern and cosmopolitan in Latin America. Their search was in the opposite direction: an inward turn, towards a different kind of connectedness, in this case to indigenous cultures and to nature. If, according to Alejandro Madrid, Nortec's 'savvy' musicians were driven largely by career and economic concerns and approached local culture through the prism of kitsch, ZZK's were more serious, even romantic, in their efforts to study Latin American traditions and merge them with urban cosmopolitanism, and this increasing engagement with such traditions entailed rethinking their relationship to digital technologies.

Initially, the computer had been central to ZZK's aesthetic; now, five years later, it was being literally and figuratively moved into the background whenever possible. Leo Martinelli started out working solo with a laptop, and then added two musicians (playing analogue synthesiser and acoustic drum) to form Tremor.[10] Chancha Vía Circuito started by sampling indigenous music on his computer; then he remixed a traditional song, 'Pintar el sol', sung by Miriam García and Alicia Solans, for his album *Rio Arriba*; finally he started taking folkloric music lessons with García.[11] The two musicians eventually performed together in public, singing duets – including 'Pintar el sol' – accompanied only by hand-held frame drums.[12] In 2011, El Remolón, also a solo laptop artist, added three musicians to form El Remolón y Su Conjunto, and he launched his albums *Boxeo Constitución* (2013) with a seven-piece ensemble and *Selva* (2014) with an acoustic set.[13] ZZK's newest and highest-profile signing, La Yegros, performed with a full band; a laptop was tucked discreetly away at the back. The last three artists were now capable of performing without laptop and even without electricity.

For such artists, musical evolution or progression involved a kind of technological regression. Digital technology, rather than being the end point of a development from tradition to modernity, and from acoustic to analogue to digital, served as a starting point for a journey back to roots – from the modern to the traditional, the foreign to the local, the electronic to the acoustic – and from solo to interactive music-making. Villa Diamante's phrase 'digital indigestion' sums up a scene in which artists, while continuing to use digital technology, were developing increasingly critical perspectives towards it, ever more aware of its limitations as well as its advantages.

ZZK's post-digital shift had multiple causes. One was the emergence of a research ethos that bordered on amateur ethnomusicology or anthropology. Having begun by sampling folkloric music, several artists became more interested in their sources and saw learning to play or sing this music as a logical next step in their musical development, even travelling to other parts of the continent to hone their skills and collect music and instruments. They sought a more direct experience than sampling – playing the music themselves or working with musicians who did. This turn to sources was underpinned by the growing identification with Latin America on the part of Buenos Aires' traditionally Eurocentric middle class in the post-crisis period. Another reason for this shift related to copyright. After signing a management deal with Los Angeles-based Waxploitation in 2011, ZZK's releases had to comply with US copyright law, which meant all samples had to be cleared legally. The complexity and expense of this process meant that artists subsequently preferred to play or sing the music themselves, or expand into a band format. A third factor was the increasing economic importance of live performance (and thus of a sense of 'liveness') in an era of declining sales of recordings. A band format was considered more appealing to audiences and bookers, particularly in the crucial European summer festival market (see below). In sum, ZZK's 'early adopters' had developed a more complex relationship with the digital by 2012. A post-digital frame underlines this evolving vision and treats the enthusiastic embrace of the digital as a historical phase rather than an end point.

The economics of ZZK Records

ZZK's history was marked by a search for a viable business model. While it began as a weekly club night, by 2011–12 its live performances took place only sporadically. Its events rarely generated significant income and sometimes operated at a loss. After several years, ZZK's founders were no

longer willing to invest the necessary time and energy in unprofitable live shows. Dull reported: 'How does a label survive month to month? It doesn't. That's the answer. We added up all the money we have coming up from local shows. It's a quarter of the money that we need to keep the label going in Argentina.'

From the start ZZK had an international orientation, organising tours in North America and Europe. These tours generated international publicity, but again they produced little in the way of profit, particularly as some artists had to take time off from day jobs. One early European tour earned the musicians around €400 each. Though there were occasional well-paid gigs and earnings rose as artists became more established, such musicians repeatedly described overseas touring as more about promotion, contacts and personal interest than income. A commonplace assumption in the digital era is that musicians invest in recording in order to profit through touring; but touring may be characterised as much by investment as revenue generation, illustrating a process of constant deferral of economic rewards (Johnston 2012). The gains of touring are often immaterial, taking the form of cultural and symbolic rather than economic capital. ZZK's directors and investors were clearly frustrated by the disjuncture between prestige and financial returns.

Some of ZZK's albums received very positive reviews in the international press, with NPR proclaiming at the end of 2011 that 'Mati Zundel is about to become a household name among music lovers in the US'. Actual sales of his album *Amazónico Gravitante* were low, however. ZZK's album sales brought in a steady trickle of income, but not enough to provide a solid platform for the business, and even investment in overseas marketing by Waxploitation made little impact on this picture.

With ZZK struggling to generate significant revenue from live music and recordings, it looked increasingly to other sources. While commissions to remix other labels' or artists' work – such as *La Revancha en Cumbia*, an album of remixes of Gotan Project's hugely successful 2001 album *La Revancha del Tango* – brought in additional income, the key to survival was synchronisations (syncs).[14] Indeed, ZZK decided to license its catalogue to Waxploitation in the hope of capitalising on the latter's contacts and securing syncs with films, TV shows and advertising in the US. Syncs for a Mati Zundel track on an Aerolíneas Argentinas advertisement and for a Frikstailers track with K-Mart brought in five-figure sums in 2012–13, providing a crucial lifeline to both artists and label. Two Zundel tracks, 'Por el Pueblo' and 'El Alto de La Paz', were synced to the TV programme 'Homeland' in 2013, and La Yegros' song 'El

Bendito' was synced to the video game 'EA Sports 2014 FIFA World Cup Brazil'.[15] Nevertheless, placing syncs at the centre of financial strategy was risky. 'It's like waving a wand', admitted Dull. 'You can't depend on it. It's a one in a million shot.' Zundel's first sync came about after a friend of Dull's picked up the track from Facebook while 'messing around' with the preview of a commercial that he was making.

Chancha Vía Circuito's experiences illustrated the rewards and challenges of looking for syncs. In 2012, he looked set to license a track to a major US TV show, which would have constituted his and ZZK's biggest financial coup to date. The deal fell through at the final hurdle, however, because the transnational media corporation behind the show insisted on the artist signing away DVD rights, and while both he and ZZK were willing to comply (believing that the fee and TV royalties justified the agreement), SADAIC refused to sign off the agreement, arguing that it was exploitative. A year after this major blow, however, Chancha secured a sync on the hit US TV show 'Breaking Bad'. The song soon had half a million hits on YouTube.

Dull described the first Zundel sync as 'literally the salvation of our year', underlining just how fragile the company's finances were, despite its international reputation. Indeed, when I first contacted Dull, he replied:

> Ninety per cent of what you see ZZK doing I run from my humble apartment/HQ … Survival is as important to us as growth is right now. Ship constantly sinking. Then floating somehow … Don't let the fancy graphics and world tours fool you, we're in constant crisis and hustling like crazy to keep it going.

ZZK's predicament underlined the difficulty in converting intangible assets like prestige, which are relatively easy to acquire in the era of social media, into economic sustainability. Dull's day-to-day struggles made the challenges for independent labels abundantly clear. Thanks to digital technologies, starting a label was easy – but making it economically sustainable was a different matter. In our final interview, Dull began: 'Just write the chapter now – it starts with "We're broke, period".' Later on he recounted a conversation with Jeff Antebi at Waxploitation: 'We asked him yesterday, when does ZZK start to make money? The answer was, maybe never. And it's true. Labels are honestly … I don't know how they exist.'

As Ochoa and Botero (2009) observed in Colombia, they exist through a mix of economies of sacrifice, gift and exchange, alongside

more standard industry models. Dull argued that the informality of Buenos Aires' economy meant that a considerable amount of work could be done through favours from friends, at discounted rates, or in exchange for a reciprocal service. ZZK was also cross-subsidised in various ways by its directors' portfolios of activities, and this seemed to be typical for small independent labels (see also Strachan 2007). Dull reported, 'I don't think any of the small or designer labels are making money. I think they do it because they love the music – first and foremost that's the reason I do it too – and they all have other jobs.' Dull continued to run WUBA and took on other marketing work; Villa Diamante had a successful DJ career; Nim ran a graphic design business.

Most musicians that I met cross-subsidised their art from other activities – a scenario typical of independent musicians in other countries (see Frith, Cloonan and Williamson 2009; Madrid 2008; Woodside Woods, Jiménez López and Urteaga 2012; Pereira de Sá and Oliveira Miranda 2012). Among ZZK and similar artists, some opted to cross-subsidise from other kinds of musical activity (and therefore live predominantly from music), while others preferred to work in a completely separate field (and thus keep their art 'pure'). DJing and music teaching were the most common choices. Frikstailers, Leo Martinelli and Axel Krygier wrote music for advertising and films, Gaby Kerpel (King Coya) for theatre (including De la Guarda and Fuerza Bruta), Daleduro for video games and Catnapp for gyms. El Remolón was a psychiatrist, while close ZZK collaborator Miss Bolivia has worked as a psychologist, yoga teacher and journalist.

Despite their limited income, many musicians displayed a non-profit brand of entrepreneurialism. An alternative or countercultural ethos was widespread in the city's independent music scenes, which drew on a historical anti-establishment vein in independent rock. This genre was strongly associated with resistance to the military dictatorship in the 1970s and 80s, and there remains today a nostalgic attachment to this 'golden age' of *rock nacional*. With the 2001 crisis, neoliberal capitalism was widely discredited and new social movements strengthened, consolidating a countercultural outlook among many young, middle-class Argentineans. The independent popular music sector was thus traversed by the ideologies of post-neoliberal new social movements as well as independent rock, producing a cultural field in which corporations were often viewed askance, independence was valorised and anti-establishment or hippy subjectivities were commonplace.

ZZK Records was a case in point. Its two Argentinean directors were open about their dislike of the business aspect of running a label. Several

of ZZK's musicians were uncomfortable with the label's partnership with Waxploitation, despite the latter's international prestige, because it obliged the label to become more business-like. ZZK Records generally styled itself as a collective, having emerged from a tightly-knit underground scene and a club night in which musical collaborations were encouraged. Villa Diamante described its defining characteristic as '*buena onda*' (good vibes), insisting that it prioritised collaboration and the collective good: 'The truth about the label is that … we never thought about it as a way to make money, but rather as a way to … join forces with artists who we thought were interesting … When you see the whole business structure of ZZK and compare it with a real business structure, it's not a business, it's something else, it's a cooperative'.

Villa Diamante and three partners opened the record shop Mercurio Disquería in 2012. His aims were twofold: to support the local independent music scene and not to lose money. Rather than supplement his meagre earnings from ZZK, he deliberately took on another unprofitable venture. He took a certain pride in recounting his counter-intuitive decision to open a record label when record labels were going out of business and a record shop when record shops were closing down. Meanwhile, digital musicians joined online groups like New *Cumbia* Makers and produced and uploaded their music for free, or created netlabels like Cabeza and SubKlub, or started online radio shows; more than generating profit, these activities required investment. Digital technologies allowed artists to inhabit the music scene in a variety of roles but also with a variety of relationships to the business of music. In the Buenos Aires independent scene, there was a vein of digital amateurism that saw individuals actively opting for non-monetised or non-profitable musical activities and accumulating cultural and symbolic (more than economic) capital in the form of internet likes, plays and free downloads. They were critical of entrepreneurialism when oriented towards business, yet engaged with it enthusiastically in small-scale enterprises with a non-profit ethos.

Disintermediation? ZZK in transnational context

Grant Dull described the birth of ZZK Records as almost an accidental move by three inexperienced friends. However, consolidating the enterprise had required them to engage with the established music industry in the global North and to learn to play by its rules. 'New technology, old structures' was his pithy summary and a corrective to a digital utopianism that fails to account fully for the maintenance of many elements of the 'old' music industry and the resources required to engage with them.

Economic opportunities for 'global' genres were still concentrated in the World Music industry and above all summer festivals, especially those in Europe, which were the growth area of the World Music market (Laing 2009, 28). Ambitious Latin American artists and labels like ZZK targeted this circuit, and securing enough dates to put on a European summer tour was a prime ambition and measure of success. The newer Global Bass scene thus appeared to serve more as a gateway into the structures of the old industry than a replacement (Marshall 2010). If ZZK started out as a collective of independent laptop artists, a characteristic digital-era phenomenon, its biggest success was provided by La Yegros, a singer backed by two songwriters and a full band whose sound might be characterised as folkloric music given a contemporary flavour with digital beats and effects. La Yegros' breakthrough occurred when her single 'Viene de Mi' was heavily rotated on the French station Radio Nova, resulting in her signing to EMI France in 2013 and touring Europe with her band – hardly a distinctively 2.0 picture.[16] The following year, Dull pointed to her three-month, fifty-date summer festival tour as evidence that her career had taken off (Erbar 2014). However, other musicians from the digital *cumbia* scene noted drily that her success represented a backwards step: from the figure of the experimental electronic music artist to that of the old-fashioned World Music star.

There were also signs that ZZK's self-presentation had shifted somewhat. In the trailer for a documentary about 'Viene de Mi', the label's signature digital technology was nowhere to be seen, replaced by traditional drums and exotic-looking costumes.[17] At Womex in 2012, ZZK described itself as 'reviving Latin American folkloric traditions through an electronic pulse', a subtle reversal of emphasis for a collective whose roots lay primarily in EDM. Despite its initial digital focus, ZZK's biggest coup was via the artist who was furthest from its laptop-music roots and adhered most closely to the old World Music industry's aesthetic paradigms, and the label's updated self-framing suggests a recognition that the surest route to success lay in deferring to old structures rather than stressing new technology.

ZZK's experiences suggested that disintermediation – the marginalisation of middlemen, as musicians use the internet to take more control over their work – was less marked than is sometimes supposed (e.g. Cottrell 2010, 19). If some traditional middlemen were indeed declining in importance, others, such as bookers, promoters, agents and publicists, were rising; the field of intermediaries was thus being reconfigured rather than removed (Baym 2010). For example, a small label owner, Pablo Martín Fernández, explained that he had to go

through an aggregator like Tunecore or CD Baby in order to place his music on Spotify or iTunes. Many independent musicians did not understand the process, so they turned to people like him to help them. He thus saw a proliferation of intermediaries, with three filters (Fernández, Tunecore, iTunes) between musicians and their audiences. Meanwhile, for many artists from the global South with international ambitions, industry rules had not changed substantially: while they availed themselves of the new digital tools for publicity and marketing, they also needed the services of agents in the global North in order to insert themselves into established commercial circuits – new technology *and* old structures.

Evidence from Argentina thus supported Rogers' (2013, 151) contention that disintermediation is a limited phenomenon since 'the process of breaking an artist on a wider stage remains largely filtered through many of the same channels as in the pre-internet era.' The challenge facing musicians was less producing or distributing music than promoting it and booking gigs. Dull argued: 'To give great shows, you need a great agent and you need a great management team.' ZZK worked with a complex network of intermediaries on three continents. To break into the US or European market it needed to have the ear of promoters and journalists; agents and publicists – traditional intermediaries who already had the attention of these key players and could provide privileged access to old industry networks – were therefore important. At its own cost, ZZK attended major international trade fairs like Womex and SXSW, looking to network and impress industry intermediaries such as European and North American promoters and bookers looking for acts. A key part of Waxploitation's investment in ZZK was temporarily to pay $3000 per month to a press agency in the US, illustrating the kind of real money moving around behind the digital free-for-all of social media.

While it is undeniable that musicians have greater opportunities to take control over their careers than in the past, they are also taking on more tasks (Leurdijk and Nieuwenhuis 2012, 63). In the music business, as in the wider 'creative economy', labour, costs, risks and pressures once assumed by institutions are now increasingly outsourced to individuals, dressed up as flexibility, independence and control. Among my interlocutors, younger musicians with few attachments or responsibilities often enjoyed this freedom, but those who were a little older were generally more ambivalent about their enforced conversion into self-managers. Digital tools added an additional layer of activities and responsibilities on top of the old machinery, a slew of new demands in

terms of online presence and self-promotion. Two ZZK artists, Chancha Vía Circuito and Mati Zundel, ruminated about quitting the music profession in 2014, such was their distaste for the work of self-management. For all the talk about cutting out the middlemen, there was some nostalgia for them once they were gone.

In the face of such pressures, the Argentine state began to intervene and its actions suggested that changes in the nature of musical work in the digital era had the potential to alter the very conception of a musician. In 2013 the Ministry of Culture decreed that a cultural producer now also had to become a *gestor cultural* (cultural manager or promoter). One of the main aims of Recalculando, a state programme discussed below, was to teach musicians to *gestionarse* (manage themselves) and thereby convert them into *gestores*.[18] That the very word 'musician' was coming under pressure suggested that important changes were afoot, although their significance was ambiguous. In the global North, where musicians are increasingly expected to see themselves as small businesses – to acquire managerial skills and manifest self-promoting desires – such shifts are usually attributed to neoliberal 'creative economy' paradigms.[19] The *gestor cultural* discourse in Argentina might have evidenced the penetrative power of such globally circulating frameworks. Yet self-management also had a distinctive local history, one with a much more collective bent, which was being reanimated in the period of ascendance of the internet. Cooperative and self-organisation movements emerged in Argentina in the mid-1990s precisely as a critical response to neoliberal conditions and blossomed with the 2001 crisis provoked by neoliberal policies (Brand and Sekler 2009, 61–2). Self-management was thus associated locally with workers collectively occupying and taking over capitalist enterprises. Given the leftist valence of this idea in recent Argentinean history, the language of *gestores culturales* had a post-neoliberal flavour and the self-management in question was partly a matter of taking fuller advantage of increased opportunities provided by the state (described below).

Other digital *cumbias*

Although ZZK coined the term 'digital *cumbia*' for its particular brand of fusion, other currents of laptop *cumbia* emerged in Buenos Aires. The genre was thus internally diverse. Around the turn of the millennium, and well before the first ZZK party, DJ Taz, DJ Yankee and the legendary *cumbia villera* musician Pablo Lescano fused *cumbia*, EDM and dub in a project called Su Majestad La Cumbia, and while the group did not last

long, DJ Taz attempted a comeback in 2012 alongside two young former disciples, Negro Dub and Che Cumbe, who had been organising large dances under the name of Colombia Fest. Their primary audience was a subset of the 'popular-class' public at the large weekend *bailantas* (dances) that are the mainstay of the tropical music industry, and their dub versions of Colombian *cumbia* appealed mainly in the Zona Norte (the peripheral northern zone of greater Buenos Aires) where Colombian music is particularly appreciated.

In 2011 an important new subgenre emerged from the commercial *cumbia* industry, epitomised by Los Wachiturros, a group with a highly digital aesthetic that mixed elements of *cumbia*, *reggaetón*, EDM and dancehall. A raft of similar *música turra* groups soon appeared, appealing mainly to younger listeners (above all teenagers) from the popular classes in the Zona Sur (southern zone). The musical elements of *música turra* were similar to those of ZZK, but the way they were used was quite different: whereas ZZK's artists often strove to experiment with and transform these features, *música turra* producers tended towards repetition of a limited palette of generic sounds, aiming to appeal to fans of mainstream *cumbia* and *reggaetón* rather than the alternative electronica and rock scenes to which ZZK was oriented.

Música turra's sound was new, but its economic model came from its predecessor, *cumbia villera*, which had emerged in the late 1990s (Magariños and Taran 2009).[20] In *música turra*, recorded music was distributed freely by any means available in order to drum up interest and the money was made at the gate of the large weekend *bailantas*. The most successful artists might perform short sets at numerous *bailantas* in a single night. Unlike ZZK, *música turra* derived significant income (fees and royalties) from live performance, the large fanbase for commercial *cumbia* and the centrality of *bailantas* in the leisure activities of the popular classes making this model financially viable.

The director of JR Producciones, a leading *música turra* production company, had a gold disc by one of his artists, Macho y El Rey, framed and mounted on the wall of his office in classic music-industry style – but this was really about appearances rather than sales, he admitted, since they gave most of their CDs away. Forms of distribution included TV, radio, informal CDs and increasingly the internet (via specialist *cumbia* websites). But *música turra* also embodied the innovations associated with Web 2.0. By uploading their music to YouTube and social media these entrepreneurs encouraged listeners to engage not only in consumption but also in collaborative and participatory practices. JR Producciones' music producer, KR Pro aka DJ Krass, uploaded not just

completed tracks but also their constituent parts and broadcast their availability via Facebook, encouraging other producers and audience members to remix the tracks, thereby making the originals more widely known – which in turn translated into greater demand at *bailantas*. Moreover he urged other DJs to publish their remixed versions on the internet or CDs: as he told me, ‘It doesn’t matter what version, just that when a group plays a show, people know the song and sing it.’

The remix culture of *música turra* involved fans as well as producers. YouTube was awash with homemade remixes of Los Wachiturros’ hit ‘Tírate un Paso’, set to videos of The Simpsons or the Mexican comic character El Chavo (with millions of views), and hundreds of home videos of teenagers dancing the song’s choreography.[21] The rise of *música turra* (a term whose origins lie in the music’s characteristic dance moves) coincided with the global success of South Korean K-Pop and particularly Psy’s ‘Gangnam Style’, in which fans’ imitation of choreographies played a key part in their engagement. Los Wachiturros’ success had much to do with the opportunities to interact with their music – to share it, remix it, dance to it and post videos of dancing to it. *Música turra* was thus highly adapted to local digital conditions and while other, more formal and middle-class sectors of the Argentinean music industry were wrestling with pay-per-download and streaming, *música turra* focused on fans freely sharing music online rather than paying to own or access it. *Música turra* might therefore be regarded as a forward-looking sector of the Argentinean music industry.

Laptop *cumbia* also encompassed a third subgenre with an entirely different model: netlabels, which disdained not only the sale of digital music but also the open pursuit of commercial goals. Netlabels release digital-only albums for free, sometimes under a Creative Commons licence, constituting a ‘nonprofit popular music sector’ built on technological and legal changes (Galuszka 2012). Such was the growth of netlabels in the digital *cumbia* and broader Global Bass spheres that digital *cumbia* blogger John Newell (2013) was moved to remark ironically: ‘I think for the first time ever there are now officially more internet record labels than there are artists and DJs. … It is an online epidemic.’ Their owners often viewed the selling of music askance, unless the transaction took place directly between the artist and the buyer, and some struck defiantly anti-materialistic poses. Buenos Aires-based netlabel Cabeza began its self-presentation: ‘In early 2008 Lucas Luisao and Martin “negromoreno” Moreno joined forces to shape one of the least profitable projects on earth.’[22] Another digital *cumbia* blogger, Cumbiónico (2012), writing about two Latin music netlabels, proclaimed: ‘Showing

oneself free to distribute music for free, as the Rebel Sounds + Latino Resiste people do, is a radical form of protest against the capitalist model of cultural production.' Buenos Aires artist Catnapp released an EP on Caballito netlabel called *No Money Whatever*. On the cover she holds a fistful of fake money displaying a cat's head, again foregrounding the decommoditisation of her music. A netlabel is thus often a labour of ideology and a statement about free circulation, one that requires investment rather than generating direct revenue. This non-materialistic trend appeared to be growing: Lucas Luisao of Cabeza reported that the 'competition' between netlabels had increased markedly since 2008. (There is of course an irony in a non-profit sector being concerned with competition.) He remarked, slightly wistfully, that the number of (free) downloads of his releases was declining substantially, now that there were more netlabels in the 'business'.

Buenos Aires netlabels like Cabeza and SubKlub released a wide variety of music by many artists, making aesthetic generalisations difficult; but their output was notably oriented towards genres such as dubstep and drum'n'bass, sometimes fused with Latin American musics. Perhaps linked to their aesthetic orientation towards rapidly evolving international subgenres of EDM, netlabels were pared-down operations that offered one important advantage: speedy turnaround. There was minimal risk of a cutting-edge sound being blunted or overtaken because of a drawn-out release schedule. Tracks could be released within weeks rather than the months or years associated with, say, ZZK. Netlabels were thus closely attuned to the rapid temporality of fast-evolving contemporary digital dance music genres.

One of the main ZZK developments of 2012 was the launch of its compilation *Future Sounds of Buenos Aires*, yet the very idea of selling a compilation album arguably looked more to the past. *Música turra* and netlabels may have provided more indicative visions of the future. By abandoning the sale of recorded music and (in the case of the former) focusing instead on fans' and musicians' participatory engagement with it, *música turra* and netlabels embodied two poles – one commercial, the other anti-commercial – of current thinking about the future of music, and of music as industry, in the age of the internet. At the time, though, three different economic and aesthetic strategies coexisted within laptop *cumbia* as a subgenre, illustrating the fluidity of the industry, of understandings of the digital and of aesthetic practices inflected by the digital.

Cultural industries, institutions and policies

Broadening out again from digital *cumbia*, significant developments were occurring in the wider institutional field in 2012–13, as the state's approach to the cultural industries evolved. It was in the realm of cultural policy that the most distinctive local developments relating to music and digitisation could be observed. While fresh debates and policy initiatives were in the air, transitions into practice were limited, and most new policy directions either failed or were curtailed by the change of government in 2015. Still, given their prominent discursive presence in the cultural sector during my fieldwork, and the importance granted to them by my interlocutors, they deserve attention.

In April 2013 the Argentinean Cultural Industries Fair (MICA) took place at Tecnópolis, the government's flagship science and technology park. Tecnópolis was an educational and cultural space hosting exhibitions designed to promote a history of local technological prowess and foster a cutting-edge, scientific national imaginary, as well as serving as a venue for artistic (and particularly musical) events. Much of MICA took place in a single, open-plan, hangar-like space, which brought contrasting ideological positions into close proximity. The event was organised by the Ministry of Culture's National Office of Cultural Industries (NOCI), and the state and its leftist politics were prominently on display: one entire wall of the hangar was lined with the stands of different government ministries, while talks typically circled around themes such as social inclusion, denunciations of the market and democratisation of cultural access. Nevertheless, MICA was a trade fair and the presence of many small- and medium-sized cultural enterprises eager to do business, alongside the Ministry of Culture's pronouncements about the value of culture to the Argentine economy, also gave the event something of a New Labour-esque flavour.

In particular, MICA provided a graphic illustration of the disputed territory of culture and intellectual property in Argentina. SADAIC, CAPIF and AADI had sponsored a Café de la Música, hosting a series of talks defending their traditionalist vision of music and IP. A few yards away, the 'hackathon', a project devoted to developing free music hardware and software, was taking place. These ideologically conflicting programmes rubbed shoulders – almost literally – for four days. Elsewhere in the building, public talks included a debate on digital culture by a distinguished panel that articulated a critical vision of the current IP regime defended by SADAIC, CAPIF and AADI. The senator Liliana Felder

launched the debate by contrasting two metaphorical locations for culture – the market and the plaza – and remarked, 'I think that everyone sat here wants culture in the plaza', revealing not only her own backing for the idea of a cultural commons but also her perception that this view was widely shared across MICA. With presentations elsewhere by Taringa! Música and prominent IP critic Beatriz Busaniche, attendees were offered a full range of views under the same roof.

Rodolfo Hamawi, the director of NOCI, organised a public meeting at MICA between Taringa! and its principal adversaries (SADAIC, CAPIF, AADI and the Argentinean Book Chamber), who met to sign a letter of intent ('Taringa' 2013). This event revealed a progressive branch of the state attempting to broker a compromise between a forward-looking digitally focused enterprise and backward-looking analogue-era institutions. The outcome was inconclusive, however, with two institutions failing to send senior representatives and public pronouncements still revealing discords.

Other institutional tensions were symbolised by the very location of the fair. Tecnópolis, a national government project, was originally planned to be built in the City of Buenos Aires but, facing stiff resistance from the city's right-wing mayor, Mauricio Macri, it was eventually constructed just outside the city limits. The federal and municipal governments were in the hands of opposing political parties, ensuring a low level of coordination between their public policies. National cultural programmes stemmed from the Ministry of Culture, whereas the municipal music office, Opción Música, was based in the Ministry of Economic Development; their respective ventures thus tended to have different ideological slants, specifically with regard to the balancing of social and economic objectives, and at times even came into competition. Opción Música, which pursued a neoliberal 'creative economy' line, attempted to reinvigorate the local music industry by introducing new models from the global North, but it faced resistance from the collecting and trade societies, disinterest from the major labels and tensions with leftist federal government institutions like NOCI. Opción Música's absence from MICA was telling.

MICA thus displayed a complex picture. There were ample signs of the conservative positions, institutional tensions and resulting stasis analysed earlier in the chapter, yet also a sense that new, more progressive cultural ideologies and policies were coalescing, ones attuned to the fair's surroundings, Tecnópolis, which exemplified a post-neoliberal national technological imaginary, revolving around the state and its concern with social inclusion. In the guise of NOCI, the state positioned itself at the centre in several ways: it hosted the event; it occupied the middle ground between Taringa! and the 'analogue' institutions, between copyleft and

copyright, expressing both sympathy and criticism for both sides; and, more broadly, it argued that its involvement was crucial to the healthy development of the cultural industries. The state's role in the field of digitisation and culture thus merits further analysis.

State digital initiatives

If early digital culture initiatives came primarily from the commercial sector, the state increasingly sought to drive developments in the field. From 2003 the governments of Néstor and Cristina Fernández de Kirchner defined themselves in opposition to the previous neoliberal regime and prioritised social objectives. Recognising the potential of new technologies to advance its overarching social and political goals, the government became a leading actor in the field of digitisation. Flagship schemes such as Argentina Conectada (a national fibre optic cable network), Open Digital Television, the one-laptop-per-child programme Conectar Igualdad and Tecnópolis were all framed in terms of promoting national autonomy, sovereignty and identity. They were presented as motors of social and cultural inclusion more than economic development.

The Minister of Culture, Jorge Coscia, described new technologies as possessing 'enormous educative potential' and 'at the service of the democratisation of culture' (Coscia 2012, 17). For Hamawi, 'technology is placed at the service of inclusion and diversity' and flagship digital programmes were aimed primarily at reducing social and cultural divides (Hamawi 2012, 8). Such discourses were underpinned by a vision of new technologies as tending to promote concentration of wealth and opportunities if left to the market. In the hands of the state, however, they might constitute technologies of social inclusion, widening participation and national unification. Above all, the digital was understood as political. *Página 12* journalist Washington Uranga argued that 'full citizenship is not possible today without thinking about the communicational and, within it, the digital', and hence 'the digital and the communicational is a space of political struggle'.[23]

There were, therefore, close connections between the state's digital strategy, political agenda, social mission and cultural vision. Widening access to both culture and new technologies was a central goal, because they formed two pillars of national sovereignty. Infrastructural programmes were intended to allow the state to distribute more widely cultural products that might fortify national integration and identity.

Increasingly, then, the digital and the cultural went hand in hand. Argentina Conectada was designed to foster not just better

communications but also the creation of 'socially valuable' cultural content. Puntos de Cultura, inspired by the Brazilian programme of the same name, funded over four hundred 'culture points', which were provided with a computer (loaded with the government-designed free operating system Huayra) and digital video cameras. Igualdad Cultural (Cultural Equality), whose tag line was 'inclusion in diversity', brought together the Ministry of Culture and the Ministry of Federal Planning, Public Investment and Services – exemplifying how culture and the digital were bound together in the national political project. Igualdad Cultural 'conceives of access to Information and Communication Technology (ICT) and culture as a fundamental right of all the inhabitants of Argentina. This initiative aims, therefore, to foster the conditions to bring about equality of opportunity across the country with regard to the creation and enjoyment of cultural goods, and access to new forms of communication.'[24] Its goal was to use new technologies to open up cultural production, distribution and consumption to every corner of Argentina, for example by broadcasting live performances via Open Digital Television and a Federal Network of Digital Culture. One planned subproject entailed the creation of an Online Music Bank, a tool for disseminating music but also facilitating the fulfilment of the quota for national music on the radio stipulated by the 2009 media law.

Another Ministry of Culture digital initiative, Plataforma Argentina de Música (PAM), was launched at MICA in 2013. PAM was an online music platform aimed at promoting the Argentinean music industry to distributors, labels and festivals around the world. It focused not on selling digital content but rather operating as a digital catalogue for the national music industry. PAM was planned as a complement to the Online Music Bank, with the former aimed at the music industry and the latter at the media and consumers. It was a commercial initiative, but like most Ministry of Culture policies, it articulated a balance between economic and social objectives and had a marked nationalist slant. Hamawi described the project as intended to promote equality and 'to put together a broader, more democratic and inclusive map of Argentinean culture'.[25] Its vision was ambitious: to offer a public-sector alternative to YouTube and iTunes, with the bonus of fostering interaction between different industry actors.

The government's policies that linked digitisation, social inclusion and cultural access and production were noteworthy, but it should be underlined that most such projects were still progressive dreams more than concrete realities at the time of my fieldwork, and few made the transition. The Online Music Bank stalled because of a clash between

widening cultural access and authors' rights. There were considerable problems around the licensing of digital content produced and circulated by the state. The government's digital TV initiative included a music branch, ACUA Música, but it appeared largely inactive. The digital TV project aimed to increase the diversity of cultural offerings, but it suffered from poor coordination between different bodies and lacked a clear sense of how content creation was going to be funded over the long term (Mastrini et al. 2013). PAM appears never to have fully taken off. It cannot be argued, then, that these music and digitisation projects had significant effects. Nevertheless, they have much to tell us about digital ideologies and desires within the orbit of the state at a particular historical juncture, one that was soon to be firmly relegated to the past.

The state's increasing activity in the cultural realm bore some fruit for independent musicians, though above all in the realm of live performance. Igualdad Cultural sent artists to perform well-paid concerts around the country, again in the name of social and cultural inclusion; Miss Bolivia, a close collaborator with ZZK, was one beneficiary. In 2013 the programme had around $1 million to distribute to 200 groups to provide ten concerts each. Another Ministry of Culture programme, Recalculando, was working with around twenty musical collectives around the country, focusing on boosting live music scenes and touring opportunities (see below). Tecnópolis provided well-paid performing opportunities for a number of DJs and bands from the middle-class *cumbia* scene.

In contrast, digital initiatives appeared poorly coordinated, sometimes even in contradiction and somewhat invisible in practice. Nevertheless, they might be understood as attempts by progressive (and often younger) voices within the state to promote change in a sector dominated by more conservative (and often older) institutions and individuals. Cultural officials and experts believed that progress would be slow and laborious in the face of the indifference or contrary interests of a static local private sector and multinational enterprises with considerably larger budgets. Furthermore, they considered both the announcement of ambitious public policies and their patchy implementation to be characteristically Argentinean. It would be a mistake, then, to regard limited progress as simply a sign of insignificance.

In this regard it is worth noting that some of the most dynamic figures in the sphere of music and digitisation moved towards increasing involvement with the state at this time. Fer Isella, who made his name as a music entrepreneur, directed the music section of MICA 2013 and led the launch of PAM, while Tatu Estela gave up his job as director of Taringa!

Música in mid-2014 to take up the post of Coordinator of New Technologies at the Ministry of Culture. Such moves would support an argument – one explicitly articulated by Estela – that the public sector was more appealing than the private in Argentina at the time with regard to the intersection of music and new technologies. In neoliberal contexts in the global North, it is usually the state that is cast in the role of the slow-moving or heavy-handed player while the private sector is presumed to be fleet of foot; but in Argentina, with the private sector dominated by 'analogue' institutions, progressive initiatives in this period were concentrated within the state.

'Where are the cultural industries heading?'

Placing Argentina's independent music sector in political context generates a more nuanced understanding of the stasis presented earlier. The Kirchner governments came to see the significance of digital technology as lying primarily in the social and cultural realms; public policies relating to digitisation and culture thus increasingly prioritised social inclusion and cultural participation over economic development. The music industry panorama at this time may then be seen as underpinned by post-neoliberal politics and, in particular, by critical attitudes to digital capitalism.

NOCI's list of objectives began with 'democratising access to and the production of cultural goods and services, [and] promoting geographical and economic decentralisation'.[26] Its stance may be summed up by the phrase 'digital social justice' (Loreti and Lozano 2012), found in a book that it published in 2012, *En la ruta digital*. With a prologue by NOCI's director, Rodolfo Hamawi, and the opening chapter by the culture minister, Jorge Coscia, this book represented an important strand of the government's thinking on culture and digitisation at the time. Hamawi (2012) argued for the internet as a tool of public service rather than private enterprise, while Coscia wrote of 'designing an egalitarian and redistributive digital policy' (2012, 14). The market was portrayed as exclusionary and restrictive, and authors promoted the state as guarantor of social inclusion, democratisation of culture and access to knowledge.

Natalia Calcagno, a Ministry of Culture researcher, described the genesis of NOCI's recent line, and in particular its choice of the label 'cultural industries' rather than the more contemporary 'creative industries', in terms of a deliberate rejection of the latter's neoliberal orientation (treating culture primarily as an engine of economic growth). There are notable echoes of Brazil's public policies on digital culture,

summarised by Horst (2011, 451) as committed to 'digital inclusion and resistance to the broader normative order of global capitalism'. While undoubtedly influenced by such post-neoliberal policy directions in the region, NOCI's vision was characterised primarily by a rejection of specific neoliberal examples, such as the UK's approach and its exportation to countries like Colombia. The stasis described earlier in the chapter may thus be seen as underpinned not just by institutional resistance and tensions but also by the scepticism of state cultural policymakers towards free-market conceptions of progress.

Within the Ministry of Culture, progressive voices attempted to formulate a vision of post-neoliberal cultural industries. The ministry's discourse on this topic exhibited the key transformative features of Latin American post-neoliberalism, identified by Macdonald and Ruckert (2009, 7) as a new agenda of social inclusion and, more specifically, 'governments' willingness to use state power to stimulate the economy and correct widespread market failures; to substantially deepen democracy by engaging citizens more directly; to use state institutions to reduce social inequalities through redistributive measures; and to renationalize some parts of the economy'. *En la ruta digital* may be seen as launching a debate on the shape of Argentina's cultural industries for the post-neoliberal as well as the digital era, and indeed positing digital technology as a powerful mediator of a post-neoliberal agenda.

'Where are the cultural industries heading?' asked a debate on the book at MICA 2013. Recent achievements were held up against strong critiques of the previous neoliberal regime. Calcagno, one of the book's architects, critiqued policy responses to digital challenges in the global North as restrictive and authoritarian and articulated scepticism towards beliefs in the balancing effect of the market. Martín Becerra, a politically influential media scholar, identified two policy phases since 2003: the first saw a bolstering of the traditional media and cultural industries in the wake of the 2001 crisis; the second, beginning around 2008, saw a deeper, more politicised questioning of the whole model (see also Becerra 2013). This second phase, in which the state was more active, saw the first articulations of a post-neoliberal reconfiguration of the cultural industries, a shift that might be summarised as moves to democratise access, balance the economic and the social and redistribute profits from corporations to creators. Certainly, statements of intent were more apparent than actual reconfigurations. For example, NOCI proposed that cultural creators be rewarded from an authors' fund, financed by a tax on the profits of ISPs and telecoms, to counteract the concentration of profits in the hands of large corporations (Hamawi 2012; Calcagno and D'Alessio

2012), but no such fund was actually created. Nevertheless, more concrete examples can be seen in state initiatives such as Igualdad Cultural, the 2009 media law (with its quota for Argentinean independent music on the radio) and the 2012 National Music Law, aimed primarily at stimulating the independent music sector.[27]

En la ruta digital revealed clearly the connection between digitisation, culture and politics, and represented a statement of intent by progressive figures within the orbit of the Ministry of Culture. Recognising the futility of a direct approach to politicians, they opted instead to promote public debate around these issues within more amenable spheres, such as universities and the creative sector, with the aim of building up a critical mass of opinion that would then oblige politicians to take notice. Becerra noted that the 2009 media law – a major legislative achievement of the second Kirchner government – grew from debates among a handful of progressive individuals in the 1980s and 90s. There was thus an important precedent for this approach and evidence that it could lead to substantial change over the long term. Becerra argued that debates in forums like MICA and *En la ruta digital* served to put key issues on the public agenda. Concrete results might be thin on the ground at first, he said, and issues might even fade from view for periods of time (something that did indeed come to pass); but opening such debates was an important first step, laying the groundwork for the implementation of new ideas in the future.

Collectivism

A commonplace local reading of Buenos Aires' music industry was that it was 'behind', as evidenced by the late arrival of services such as iTunes and streaming – the implication being that it differed from that of the global North in terms of its position on a developmental curve rather than following a different trajectory. A clue to a different reading, however, was provided to me by Nicolás Falcoff, MICA panellist and director of the independent label Sura.

> We're realizing that we're not going to get anywhere on our own, that the whole is greater than the sum of its parts, that the way to work is to work collectively, that's what's coming now. I believe in work networks, in collective work, in solidarity economics, in networks of fair trade, in another way of making culture and another way of doing business … I'd tell anyone who wanted to do business to devote himself to something else, there are tons of businesses that are much more profitable than this one. The

purging that took place as a result of this crisis meant that the pirates and the mercenaries really knew that there wasn't much for them here. Those of us who remain, the survivors, are organizing ourselves to see how, from an equitable starting point as far as possible, we may be able to create something a bit stronger and carry on doing what we like – which is music.

In Falcoff's vision, Buenos Aires' independent music scene, rather than presenting an inferior, belated copy of industry developments in the global North, displayed a search for alternatives to digital capitalism. His position was inspired more by social movements than capitalist entrepreneurialism, by a search for sustainability more than profit and growth. He described entrepreneurship among independent musicians in collective rather than individual terms, as 'the artist who is being empowered and saying "I want to do this, so I get together with another artist and another and we create a collective of artists to establish a work unit to put on [concert] series"; I see a lot of collective management and partnership among artists.'

State initiatives, too, were focused less on individualist entrepreneurialism than on collaboration. 'Collectives are the central actors of this new culture', stated Recalculando's promotional video.[28] This Ministry of Culture programme was working with twenty groups in mid-2013 and called them collectives, even though they were formed around record labels, because making records was only part of their activity. The term 'collective' thus signalled a shift in the nature of a record label, now conceived of as an association of artists from diverse fields engaged in a wide range of activities, with a different way of working – horizontal, collaborative, networked – and sustainability as its overriding aim. Recalculando promoted collective structures, arguing for strength in unity and a network as more than the sum of its parts. Its position was that such structures fostered a solidarity economy and eased the financial challenges that independent musicians faced under digital conditions.

Collectivism and cooperative thinking have a long history in Argentina, appearing at various points in the twentieth century. They blossomed in the late 1990s as increasing numbers of workers were marginalised under neoliberal conditions (Sitrin 2012; Zibechi 2012). The 2001 crisis saw an exponential rise of collectivism across Argentinean society, not least in the arts world (Giunta 2009, 54–64). Institutional weakness and economic hardship led artists to form collectives with a common vocabulary (horizontalism, self-management) and common traits (networked, economically autonomous, politically active and operating by consensus).

Just as this broad wave of collectivism was largely a bottom-up

phenomenon, post-neoliberal reimaginings of the cultural industries were not confined to cultural officials and academics but also emerged from the independent music sphere. Falcoff presented his initiative as separate from Recalculando, as a private rather than government-sponsored programme, illustrating how collectivism circulated among independent musicians quite autonomously from government pronouncements. Indeed, many younger officials in Ministry of Culture music programmes such as Recalculando had started out in the independent music sphere. The transfer of ideas was thus just as much from the musical grassroots to politics as vice versa.

Collectivism was also a feature of the middle-class *cumbia* scene, not just in ZZK Records but also in large *cumbia* orchestras like La Delio Valdez, Sonora Marta la Reina, Orkesta Popular San Bomba and Cumbia Club La Maribel, which emerged from 2009. With one to two dozen players, they were not conceived as economic ventures, but rather stressed sociability over financial gain. Luciano Choque Ramos abandoned an earlier digital *cumbia* project, Imperio Diablo, to form Todopoderoso Popular Marcial in 2010, and he praised the symbolic impact of 'twenty people doing something together, the same thing, in real time – and it's pretty exciting what happens. You always see smaller groups or soloists or DJs or something quite individual, so seeing something more collective mobilises people'.[29] Such orchestras stood symbolically against both the digital and individualistic entrepreneurialism.

The collectivist ethos in the independent music sector thus evidenced the confluence of state and civil society ideologies and of post-neoliberal politics and subjectivities. It represented a vision of resistance among low- and mid-level actors to the intensifying corporatisation and concentration of the music industry. The currency of collectivism both within cultural institutions and among cultural producers, and its roots in local experiences after the 2001 crisis, suggested that it was more than just a passing fad or opportunistic slogan. Though it was to come under pressure as a result of future political changes, collectivism constituted a noteworthy response to digital conditions in Argentina.

Argentina in regional context

An important inspiration for Recalculando (and its predecessor, the Network of Independent Collectives or RECI) was Brazil's Fora do Eixo ('Off the Axis'), a national network of collectives that began working in 2005 to increase performing opportunities for independent musicians. The result was a national circuit, outside the structures of the mainstream music

industry, to facilitate touring and reach new audiences. According to the Brazilian cultural official Jéferson Assumção (2013), Fora do Eixo (or FdE) brought a third player into the equation, alongside the state and the market: the community or collective.

Assumção's adaptation of the state/market/civil society triad illustrates the extent to which collectivism was shaping social, cultural and political imaginaries in post-neoliberal Latin America, and the same was true in the technological sphere. Regional conceptions of the internet revolved to a considerable degree around his third term. As Garrido (2012, 94–5) noted, the internet was rarely treated as a commercial space by young people in Buenos Aires; its social and cultural aspects were paramount and ideas of networking and sharing were much more prominent than monetising. Similarly, Horst (2011) identified three key themes in the new media landscape in Brazil: digital inclusion, free culture and networked sociality. The last of these was utilised by FdE to try to strengthen independent music production across Brazil, generating publicity and audiences for live music and fostering the circulation of bands (Garland 2012, 510). The emergent collectivism in Brazilian and Argentinean independent music scenes was thus underpinned by particular local understandings of the internet.

FdE and Recalculando had fervent advocates, such as Assumção and British independent music network UnConvention.[30] It should be underlined, however, that the Brazilian network also generated a growing wave of polemics from grassroots and academic sectors (e.g., Garland 2012; Miseravel 2013). Nevertheless, such programmes were calibrated to the challenges and opportunities facing the independent music sphere in countries where the internet was conceived as functioning more effectively in fostering social networks than in selling digital content or services, and where governments placed more emphasis on digital inclusion than e-commerce.

A number of initiatives discussed in this chapter, like Recalculando, illustrate the growing links between the leftist state and the independent music sector, which had been left largely to the market during the neoliberal 1990s. The 2009 media law included a quota for Argentinean independent music on the radio, while the 2012 National Music Law gave concrete form to the sense that the independent music sector lacked economic viability and required state support, particularly in the wake of the Cromañón tragedy. NOCI's proposed authors' fund provided a further example of the state's recognition of the tendency towards the impoverishment of cultural producers in conditions of digital capitalism and its desire to intervene to alter this situation.

One might therefore identify several distinctive features of the independent music sector in Argentina and Brazil, the two largest Latin American countries to take a post-neoliberal turn in the early 2000s. One was collaboration between the state and the independent sector, based on a questioning of digital capitalism and its effects on smaller players. Both sides agreed that state intervention provided a necessary rebalancing of a rapidly concentrating field. Digitisation was seen as both a threat and an opportunity, with the market posing the former and the state guaranteeing the latter, and – in this vision – the opportunity was social and cultural more than economic. A second feature was collectivism. If the spread of digital technology fostered a 'do it yourself' independent ethos in the 1990s, the 2000s saw the rise of 'do it together' – also making extensive use of new technologies, but underpinned by a more collaborative ideology. A third was the particular characteristics of internet use, which focused on digital inclusion and networked sociality and thus supported the collectivist paradigm.

Viewing Argentina through the lens of Assumção's triad of state, collective and market, three conceptions of digital technology appeared to be at stake. For the state, digital technology was primarily a technology of social justice and cultural participation; for the collectivist paradigm, a technology of social aggregation and networking; and for the market, a technology of economic development and profit. These three conceptions were not mutually exclusive and many initiatives, both state and private, incorporated all three to different degrees; the issue was therefore one of emphasis. That said, *En la ruta digital* articulated a direct contest between the state and market visions of new technologies and it advanced a post-neoliberal line on the social potential of digitisation and its intimate connection to culture. In relation to the independent music sector, with commercial digital initiatives struggling, it was arguably in the first two realms that the most noteworthy developments were taking place in 2011–13, and the first two ideologies of the digital were in the ascendant. The state's digital initiatives and the collectivist movements, and their mutual interactions, showcased at events like MICA 2013, aspired to shape a post-neoliberal music industry, and their efforts, however abortive they turned out to be, constituted a distinctive contribution to global music industry debates.

Coda

The election of the centre-right candidate Mauricio Macri as president in

late 2015, after twelve years of leftist governments, changed Argentina's political complexion overnight. It also provoked a wave of profound concern within the independent cultural sector. As mayor of Buenos Aires, Macri had been known to independent musicians mainly as the force behind the closure of many small venues and the imposer of restrictive legislation.

Two important shifts can be noted in the Macri period. One was the waging of a 'culture war' on the Kirchners' legacy.[31] This campaign focused not just on projects explicitly tied to the former presidents, such as the Kirchner Cultural Centre, but also on social and cultural programmes such as the school netbook initiative Conectar Igualdad.[32] The other shift was a return to neoliberal ideologies and more market-based policies, with effects immediately felt in the cultural field. For example, the progressive National Office of Cultural Industries (NOCI) was closed, to be replaced by a Department of Culture and Creativity, led by Enrique Avogadro, a former cultural official in Macri's right-wing city government. The department immediately abandoned NOCI's 'cultural industries' focus in favour of a 'creative economy' line, initiating a Network of Creative Cities.[33] Whereas the collective had emerged in the Kirchner years as an important cultural player, 2016 saw the installation of the entrepreneur at the heart of the government's imaginary.[34] The collectivist music programme Recalculando was disbanded, its *gestores culturales* replaced by Argentina Creativa's *emprendedores culturales* (cultural entrepreneurs). The Online Music Bank, which had changed focus and moved towards digitising old tango and folklore records, was also shut down. The day after the election, its director, Tatu Estela, was refused access to his office in the Kirchner Cultural Centre; most of his team were fired and other cultural programmes were removed from the building.[35]

It should be recalled, however, that even a year before the election, many of the enterprises and initiatives considered in this chapter were struggling either to get off the ground or to continue operating. The 'active state' had formulated ambitious, progressive plans for digitisation and culture, focusing on connectivity, visibility and redistribution of revenue, yet it was having little impact on musicians or the circulation of music. Its digital music initiatives made no dent in the dominance of Facebook and YouTube, far and away the most visited websites in Argentina ('Encuesta nacional' 2013). Taringa! Música and PAM, local initiatives from the private and public sector respectively, had failed to challenge the hegemony of behemoths from the global North. Taringa! Música was going to be the Latin American Spotify, until Spotify got there first. PAM, meanwhile, appeared defunct. Not all the stunted growth or demise of such

developments can therefore be laid at the door of Macri's government.

If we consider such programmes in terms of their effects, they appear insignificant. If we consider them, however, in terms of the thinking behind them, they tell us much about efforts from both public and private sectors to construct alternatives to dominant models of digital capitalism. They may have disappeared under pressure from global forces, multinational corporations and changing national political priorities, yet their fragility and evanescence makes it all the more important to document and analyse them.

From the perspective of independent musicians to whom I spoke in 2016, the panorama appeared unpromising, even worrying. If leftist governments had been able to do little to stem the concentration of rewards in the hands of an established elite of major concert promoters and performers, many of them foreign, a right-wing government that actively supported this process looked unlikely to emerge as a saviour. Even without the political change – a depressing development for many alternative-minded musicians – conditions were hardly favourable for large swathes of the Argentine music industry.

In a frank magazine interview over a year before the election, Grant Dull declared that 'the industry is shit … full of bad vibes and sharks' (Erbar 2014). He acknowledged publicly that the label usually lost money or at best broke even; that every year he considered giving up; and, more poignantly, that 'money and the suffering of wanting to make a business among friends is always going to damage friendship'. By 2014 most of ZZK's artists retained only a tenuous link to the label. Some had signed with other labels or released albums independently, leaving ZZK with leftovers: a digital release, a percentage of a back catalogue, or a booking or management fee. There had been a proliferation of micro-deals as each artist negotiated each aspect of their activity separately. As one told me, they had come to the realisation that the label was not going to make a living for any of them, so each one was now trying to make their own way without completely abandoning the ZZK brand.

This downbeat picture found echoes in reports from elsewhere in Latin America, such as Mexico City (Woodside Woods et al. 2012), where the flourishing of creative innovation was accompanied by 'the extensive exclusion of the majority and the condemnation of creatives to intermittency and precarity' (García Canclini and Urteaga 2012, 203). In Santiago de Chile, the majors retrenched; independent labels were scarce and run on a shoestring; there were few small to medium venues; independent artists suffered from lack of audiences; and profit was almost entirely concentrated in mega-concerts by international artists (Solís

2010). One frustrated musician labelled Santiago's independent scene as 'in intensive care' (Solís 196) – worse than 'in the waiting room'.

Nevertheless, there were also some grounds for more optimistic assessments. The Digital Music Reports for 2012 to 2014 reported strong growth across the region and predicted a bright future for the digital music business in Latin America. The 2017 IFPI Global Music Report announced that Latin America was the region with the highest level of growth in revenue from recorded music for the seventh consecutive year, with a 12 per cent rise. Digital revenue grew by 31.2 per cent and streaming revenue by 57 per cent.[36] The previous year, Argentina had seen an increase of 34.8 per cent in revenue from recorded music, thanks to a 140 per cent rise in digital revenues, and streaming was making increasing inroads, representing 86.6 per cent of the digital market.[37]

Within the scene that I studied, ZZK Records' fortunes were waxing again by 2017, on the back of several productive crowdfunding campaigns and the international success of Nicola Cruz, who signed to the label in 2015. Grant Dull launched a new venture in Ecuador (AYA Records) and focused increasingly on making documentaries outside of Argentina (ZZK Films). Back in Buenos Aires, success stories could be found among post-digital projects such as traditionalist middle-class *cumbia* orchestras (such as La Delio Valdez) and neo-World Music bands (such as La Yegros), rather than more experimental digital projects. A more upbeat picture could also be seen in *música turra*, which showed similarities with Brazilian digital music scenes like tecnobrega, baile funk and electronic forró. These scenes, with their enthusiastic adoption of new technologies, legitimisation of informal copying and distribution, and emphasis on live performance, have been held up as innovative responses to the crisis in the recording industry and possible models for the future (see 'The Paraense Tecnobrega' n.d.; Howard-Spink 2006; Comin 2011; Krauskopf n.d.; Pereira de Sá and Oliveira Miranda 2012). Vianna (2011, 247) argued that such vibrant and inventive new music economies, which were emerging on the edges of large Brazilian cities, might point the way forward for the mainstream music industry.

Still, there was continued uncertainty over which of these futures lay ahead, suggesting the continued aptness of the metaphor of the waiting room – although it might also be argued that the independent sector's struggles had been going on for so long in Buenos Aires that they were actually the destination. However, this metaphor serves, above all, to capture the sense of uncertainty within the sector at a particular historical juncture. In 2012 the independent music industry sensed change coming, but was pulled in several directions at once. The city

government's Opción Música regarded the local music industry as needing to be brought up to date with developments in the global North; it thus focused on translating new business models from the outside world to Argentina. The Ministry of Culture and NOCI looked to other sources of inspiration, such as the egalitarian, redistributive cultural policies of Brazil. To generalise, the city government sought to stimulate digital entrepreneurialism while the national government spoke of digital social justice. In both cases, Argentina was seen as behind, and policies were designed to pull it forwards, though in different directions, illustrating divergent orientations to two rival spheres of influence on Argentina – the global North and Latin America – and to the neoliberal and post-neoliberal ideologies that coexisted and competed in Buenos Aires' cultural sector. Complicating the picture further were the old 'analogue' institutions – particularly the collecting and trade societies – which, with their eye on the past, tended to resist both of the competing new models. It was unsurprising, then, that the independent music sector felt like it was stuck in the waiting room.

Notes

1 The subsequent publication of several books (such as Vila and Semán 2011; Semán and Vila 2011; Fernández L'Hoeste and Vila 2013) altered this picture.
2 There is an extensive literature on *cumbia villera*, in which the work of Pablo Semán and Pablo Vila has been particularly important. Irisarri 2011 is, however, the only study of digital *cumbia*.
3 'Independent' will be used here to refer to music other than *música tropical*, not released by a multinational major label.
4 http://lic.cultura.gob.ar/foros-de-cultura-digital. No longer available.
5 http://leymeca.com.ar. No longer available.
6 http://latinbutcool.blogspot.co.uk/2008/03/enter-cumbia-phenomenon.html Invitation only.
7 https://www.facebook.com/groups/Cumbiamakers. Accessed 9 January 2022. www.generationbass.com; http://nucumbiaexperience.com. No longer available. www.cassetteblog.com. Accessed 9 January 2022.
8 http://zzkrecords.com. Accessed 9 January 2022.
9 http://zzkrecords.com/mixtapes. Accessed 9 January 2022.
10 https://www.youtube.com/watch?v=dRDbttlaZQw. No longer available.
11 https://www.youtube.com/watch?v=9CAzSMAqS10. Accessed 9 January 2022.
12 https://www.youtube.com/watch?v=XPO-MT6zkiI. Accessed 9 January 2022.
13 https://www.youtube.com/watch?v=eY7SVqfS7q0. Accessed 9 January 2022.
14 https://www.youtube.com/watch?v=awR63tm-O5A&list=PL728126CAF0D66B92. Accessed 9 January 2022. Synchronisations (syncs) involve the licensing of music for addition to video media content
15 https://www.youtube.com/watch?v=pHkzRyQi2dM. https://www.youtube.com/watch?v=Yjow4fibUuA. https://www.youtube.com/watch?v=5AnuawYM9mg. Accessed 9 January 2022.
16 https://www.youtube.com/watch?v=WtsjrvwqIr0. Accessed 9 January 2022.
17 http://vimeo.com/68851466. Accessed 9 January 2022.
18 See, for example, http://www.youtube.com/watch?v=WyQG-UwgIVQ. Accessed 9 January 2022.
19 This was one theme that emerged from the conference 'The small economies of the "new" music industry', University of Bristol, 25 March 2013.

20 It also echoes the model of digital urban music scenes in Brazil (Howard-Spink 2006; Pereira de Sá and Oliveira Miranda 2012).

21 https://www.youtube.com/watch?v=jVLAllwh9Tk (official video). Accessed 9 January 2022. https://www.youtube.com/watch?v=SJHpUFYFgtw (Simpsons remix). No longer available.

22 https://soundcloud.com/cabeza-netlabel. Accessed 9 January 2022.

23 http://lic.cultura.gob.ar/foros-de-cultura-digital. No longer available.

24 http://www.igualdadcultural.gob.ar. No longer available.

25 http://www.mica.gob.ar/1843/la-secretaria-de-cultura-de-la-nacion-lanzo-la-plataforma-argentina-de-musica-pam/. No longer available.

26 http://www.cultura.gob.ar/areas/industrias-culturales/. No longer available.

27 http://www.musicosconvocados.com/marco.html. Accessed 9 January 2022.

28 http://www.youtube.com/watch?v=WyQG-UwgIVQ. Accessed 9 January 2022.

29 Interview with Luciano Choque Ramos, May 2012.

30 https://www.unconventionhub.org/. Accessed 9 January 2022.

31 http://lab.org.uk/argentina-culture-wars. Accessed 9 January 2022.

32 http://aerom.com.ar/el-vergonzoso-titulo-de-clarin-para-justificar-el-fin-de-conectar-igualdad/. No longer available.

33 http://redciudadescreativas.cultura.gob.ar. No longer available.

34 https://www.rebelion.org/noticias/2016/4/210927.pdf. No longer available.

35 Such shifts in the institutional landscape are illustrated by the disappearance of a number of the webpages that I used in drafting this chapter.

36 http://www.ifpi.org/downloads/GMR2017.pdf. No longer available.

37 http://www.revistapym.com.co/destacados/mercado-musica-streaming-2016. No longer available.

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4
Oral traditions in the aural public sphere: digital archiving of vernacular musics in North India

Aditi Deo

This chapter is an ethnographic account of a spectrum of digital archiving and documentation initiatives centred on oral vernacular musics in the regions of New Delhi, Rajasthan and Gujarat in northern India.[1] The centrality of vernacular traditional domains, musical or otherwise, to popular and state imaginaries in India is now part of academic wisdom.[2] Oral musics, as part of vernacular expressive culture, have been called upon in the crafting of the colony, the nation, and in more recent periods, the collapsing of boundaries – regional, national and religious. From the point of view of metropolitan India, these musics have served diverse roles, representing regional essences, alternative selves and internal others. The audiovisual archiving of such musics has historically been a distinct, if esoteric, activity integral to both colonial projects of salvage anthropology and postcolonial self-representations of national cultural diversity. During the past decade, such archiving has increasingly been framed at the intersections of discourses, on the one hand about heritage, identity and development, and on the other hand about the potentialities of digital technologies for documenting and disseminating. Moreover, partly through technological transformations, the notion of the archive itself has been complicated by, among other factors, the destabilisation of its singularity as a repository constructed through central 'commencement and commandment' (Derrida 1996, 1) to include decentralised modes of archive building, and a shift from an emphasis on preservation to one that increasingly includes access and circulation.

The chapter takes practices of digital documentation, archiving and dissemination in the present day as an ethnographic point of entry to inquire into the renewed attention to oral vernacular musics as valuable resources. In particular, it is concerned with tracing the participation of such activities in the constitution of what in the Indian context is increasingly an 'aural public sphere' (Ochoa Gautier 2006). I draw upon ethnographic research in northern India with archiving initiatives of diverse scales and lifespans – ranging from longstanding institutions that are part of international academic circuits, to fragile networks of local music enthusiasts. Perceiving digitisation to be inevitable, existing audiovisual archives grapple with the reconfiguration of institutional practices as they convert analogue holdings to digital formats.[3] At the same time, the easy availability of consumer-oriented digital technologies for recording, storage and circulation has catalysed small- and large-scale projects for documentation and dissemination of vernacular musics. In this project, the aim was to capture both ends of the spectrum of practices, thus problematising any normative account of digital archiving and portraying the burgeoning heterogeneity of current activities.

The attention to expressive forms through their digital documentation is intertwined in India, as elsewhere, with a technologically-induced preoccupation with the recording of cultural memory. Describing the digital present as an era obsessed with archives, performance scholar Diana Taylor suggests that anxieties about loss and forgetting are linked to the ways that digital technologies structure information, knowing and memory. Through apparently limitless access to information, '[digital] technologies offer new futures for our pasts; the past and present are increasingly thought through in terms of future access and preservation' (Taylor 2010, 2). One reflection of such linkage is the rising popularity in transnational public spheres of the paradigm of 'digital heritage'. This paradigm advocates the management of cultural memory through the use of digital and media technologies by cultural institutions, notably museums and archives, engaged with traditional forms. It naturalises an understanding of heritage as both particular and yet a universal good, along with a view of digital technologies as affording extensive preservation, wide dissemination and democratisation of cultural access (Cameron 2007). UNESCO's 2003 Charter on the Preservation of Digital Heritage describes it thus: '[Digital heritage] is inherently unlimited by time, geography, culture or format. It is culture-specific, but potentially accessible to every person in the world. Minorities may speak to majorities, the individual to a global audience. The digital heritage of all regions, countries and communities should be preserved

and made accessible, so as to assure over time representation of all peoples, nations, cultures and languages' (UNESCO 2003a, 76). Such perceptions about the universal significance of traditional forms and the affordances of digital technologies mediate also the proliferation of documentation initiatives for vernacular musics in India. This drawing in of the oral into digital aurality is not limited, however, to the circulation of musics and related discourses; it also crucially pertains to the perceived affordances and powers of digital technologies of circulation, and the particular meanings and practices with which they are associated in diverse contexts.

Through ethnographic research in three distinct initiatives for audiovisual archiving of vernacular musics, the chapter attempts to unpack this very imbrication of the musical-discursive and the material-technological. It aims to delineate the diversity of investments in oral vernacular musics and their digital archiving in India today by tracing the mutual mediation (Born 2005a, 2011) of musical, discursive and technological-material strands in such activities. I have two broad objectives. First, in drawing out the particularities of relationships between peoples, musics, discourses and technologies, I offer insights into reconfigurations of public discourse centred on oral musics – what Ana Maria Ochoa Gautier (2006) describes as the 'aural public sphere'– through the facilitation of digital technologies. Second, I am interested in the manners in which digital technologies are deployed – in practice and rhetorically – to carve out and regulate spaces in which these musics may partake.

Vernacular musics and aural public spheres

Ethnomusicologist Ana Maria Ochoa Gautier (2006) develops, through the case of Latin America over the past century, the concept of an aural public sphere as a network of discourses, practices and sounds centred on regional traditional and popular musics. She argues that since these musics are imbued with regional/local and temporal significations, the aural, concurrent with the textual, emerges as a critical sphere for both the constitution of and negotiations about the nature of Latin American modernity. Central to these debates are cyclical relationships between 'epistemologies of purification' (Bauman and Briggs 2003) which provincialise these musics and 'epistemologies of transculturation' which valorise hybridity. That is, historically, modernity in the region has been characterised by recursive exchanges between two kinds of discourse. The

first kind, purification, denotes discursive attempts by, for instance, folklorist activists or scholars to produce accounts of musics (and musical categories such as folk or popular) in terms of a domain separate from socio-temporal transformations, and thus as standing outside the currents of modernity. The second kind, transculturation, points to those varied practices that attempt to disrupt such separations through, for instance, practices of sonic entextualisation and recombination by musicians and music industry. Ochoa Gautier suggests that, in the present, such historical processes of the constitution of aural public spheres centred on Latin America as a region are accentuated given the technologically intensified escalation of sonic circulation.[4]

The concept of aural public spheres – discursive spaces that, on the one hand, engage regional musics as cultural (and potentially political) entities and, on the other hand, are mediated by musical sounds – is productive for recognising the constitution of the regional also in Indian modernity. Despite the changing political contours of the state over the past 150 years – including colonial governance and a nationalist independence movement until 1947, modernist nation-building until the early 1990s and economic liberalisation since the 1990s – the national imaginary has continued to be preoccupied with tradition as a marker of Indian identity, with the multiplicity of regional cultures and languages, and with the question of the location of the non-urban and rural (e.g., Muthukumaraswamy and Kaushal 2004). In this light, oral expressive forms have remained central in public discourse in India to configuring the relations between varied regions of representation and communities of belonging – national, regional, rural as well as identity-based. In recent decades, this national milieu has been compounded by powerful international policy discourses that foreground oral traditional forms as global heritage, such as UNESCO's Recommendation on the Safeguarding of Traditional Culture and Folklore (1989) and, more recently, its Convention for the Safeguarding of Intangible Cultural Heritage (2003b).

In these contexts, documentation and archiving have come to represent archetypal modes of valorisation of vernacular musics. Moreover, as in other parts of the world (Ochoa Gautier 2006; Sterne 2003, 313), such activities have in turn been central to shaping the very category of oral vernacular musics in modern India. What follows is a brief examination of the heterogeneous investments in aural public spheres and intertwined interests that have shaped the documentation of oral musics over the past one and a half centuries in India.

Oral vernacular musics[5] in India refer to '"little" music traditions … the music of [India's] castes and tribes' (Babiracki 1991, 69), grouping

together two commonly used categories: folk music and its north Indian analogue *lok sangit*, and tribal music. The production of this distinct category in discourse about India is historically inseparable from the practices of ethnological documentation of vernacular culture pursued by the British colonial government. In the late nineteenth century, partly for political and bureaucratic facilitation and partly integrated into Orientalist discourse, colonial ethnographers – often non-local, British administrative personnel (Pels 1999) – documented the musics and songs of the peoples in the subcontinent along with their languages and customs. Ethnological work went hand in hand with steps legally to formalise existing social classifications of 'castes' or *jatis*, and to define relatively autonomous communities outside of caste relationships as 'tribes'.[6] In parallel in this period, regional affiliations became an organising framework for the study of oral musics in colonial and nationalist discourses. The early textual documentation and the ensuing ethnographic publications are often regarded as the first systematic archive of folk culture for India as a nation (Chatterji 2007; Naithani 2005).[7] Such documentation also drew the attention of Indian intellectuals to folklore as 'living history', leading to its intertwining with nationalist discourse and its independent collection also by Indians. Documentation efforts in the early twentieth century by regional elites, such as those in Bengal, arguably prefigured later nationalist archiving initiatives that emphasised both the diversity of vernacular cultures as well as the subsumption of this diversity within a nationalist narrative.

Academic studies of India's 'little music traditions' over the subsequent century by both Western and Indian scholars have been influenced by disciplinary approaches in anthropology, folklore studies and ethnomusicology as well as music studies in India.[8] Universalist assumptions about musical socialities formerly shared by these disciplines – rural contexts, oral transmission, anonymous authorship and continuous tradition (e.g., Middleton 1990) – were brought to bear in classifying oral musics in the Indian context. Studies have centred on ethnographic descriptions, relationships between varied categories of musics (folk and tribal, popular and classical) and the politics of academic approaches to the study of Indian musics (e.g., Babiracki 1991; Bhattacharya 1968; Ranade 1985; Wolf 2000).[9] As both Western and Indian scholars attempted to trace the varied origins of and influences on oral forms – from identifying roots in ancient Hindu rituals, to assertions about invented traditions – the musics emerged in academic discussions as key discursive sites for the reconstruction of national and regional histories (Chatterji 2004).

When recording technologies entered India in the early twentieth century, they also fostered the audio recording of vernacular musics, motivated partly by academic concerns and partly by commercial interests. Western academic research about music in India, linked to colonial documentation projects and the discipline of comparative musicology, began to translate into audio documentation (Jairazbhoy 1991). Also in this period, the gramophone industry began to explore India as a market, turning sometimes to vernacular genres (Kinnear 1994); from the 1930s such records were broadcast on Indian public-service radio. Vernacular sounds thus began from this decade to circulate to a limited extent through technological mediation.

After India's independence in 1947, formal musical documentation as part of the deliberate construction of a national culture included folk and tribal musical forms alongside classical Indian traditions. Autonomous state bodies were established over several decades for the preservation and promotion of Indian cultural heritage, entrusted partly also with developing audiovisual archives at regional and national scales (Haksar 1990).[10] The location of such musics in postcolonial imaginaries was consolidated through All India Radio's public-service broadcasting which, from the 1950s, began to feature vernacular 'folk musics' in nationwide programming, and from the 1970s Doordarshan, the newly established national television broadcaster, continued this trend. For several decades the predominant sites for audiovisual archiving of oral musics were such centralised institutions that projected the nation and its neatly divided regions as its publics.

Concurrent with the regimented top-down engagement of state agencies with vernacular performance forms, dispersed documentation activities developed quite independently, unevenly spread across the geographic span of the nation. Several instances of small-scale documentation of local oral musics outside of formal archives emerged with the use of the decentralised recording medium of the cassette, motivated in various ways – by academic interests, by musical appreciation, and/or by a concern with the sustainability of traditional arts/crafts and their practitioners. In Rajasthan, where I carried out research with two music archives, such activities were directly linked to the shaping of a 'musical region' (Feld 1991) recognisable nationally and internationally through the musics of its folk performers. One of the most striking examples here of informal activities developing eventually into a formal archive was Rupayan Sansthan, a cultural institution in Jodhpur, Rajasthan. Folklorist Komal Kothari along with writer Vijaydan Detha established Rupayan in the 1960s to conduct sustained cultural

documentation with regional hereditary musician communities, among these the Manganiar, Langha, Dholis and Kalbeliya. They began to develop an audio archive soon after, partly with the help of Kothari's links with foreign researchers who worked on Indian musics and grants from transnational cultural organisations. The technological resources that this support facilitated significantly enhanced the archiving practices. Kothari located himself as an intermediary between musicians and visiting scholars, requesting from the latter duplicate recordings to develop a local repository. Simultaneously, Rupayan worked on exploring new avenues for musical livelihoods for hereditary musicians, especially in developing new performance platforms. Rupayan's success – through its national and transnational connections – has been effective in presenting Rajasthani folk music as transcending merely regional appeal, while also leading to the establishment of several regional institutions that associate music archiving with the nurturing of musical livelihoods (Ayyagari 2009). Among these is Lokayan Sansthan in Bikaner, one of the research sites that I foreground in this chapter.

A further distinctive vector influencing the growth of current archiving practices comes from global development regimes. Since the 1970s, development discourses have gradually become attentive to cultural considerations (Arizpe 2004; Sen 2001). This came about partly from a recognition that economic development policies were failing to redress global inequalities of resources and partly out of the critiques of economic development as a paradigm made by local and transnational indigenous movements. Simultaneously, traditional cultural forms and folklore were being foregrounded globally through the work of UNESCO and related organisations; as mentioned, critical transitions in this history were the 1989 Recommendation on the Safeguarding of Traditional Culture and Folklore and the 2003 Convention for the Safeguarding of Intangible Cultural Heritage. Culture emerged as a crucial site of interest also for transnational charitable organisations. In India these combined developments translated into a greater focus on investing in the material and 'intangible heritage' of the nation (see Kirshenblatt-Gimblett 2004). A particularly prominent example of the ensuing support for vernacular music archiving is that of the US-based Ford Foundation, which developed an overt folklore initiative in the late 1980s.[11] In the following decade, the Ford Foundation funded several projects engaged in the documentation of 'living' folk cultures that drew attention to the 'diversity and pluralism' of India's cultural practices (Gandhi 2000, 48). Without any commitment to technological determinism, it is safe to surmise that the Ford Foundation's growing emphasis on documentation as a mode of

valorisation of folklore was catalysed by the growing prevalence of analogue audiovisual recording technologies. Its interest in documenting folklore in India continues into the digital era, evident in its prominent involvement in several of the archiving initiatives that I encountered: Rupayan Sansthan in Jodhpur; the New Delhi-based Archives and Research Centre for Ethnomusicology (ARCE); the Kabir Project in Bangalore; and the Travelling Archives in Kolkata.[12]

Archivists have suggested that the affordances of digital technologies, especially the ease of collecting and organising information, are in themselves an incentive to archive (Manoff 2004). In India, as globally, the promises of giving a future to what are considered to be obsolete technical formats and of opening up what have been restricted analogue collections to versatile new uses are leading to the digitisation of audiovisual collections of varied scales.[13] Digital technologies function in this context at once as concrete modes for archiving and dissemination and as rhetorical devices in attracting resources. Since the early 2000s, not only the international Ford Foundation but other philanthropic agencies including the Prince Claus Fund and Charles Wallace Trust, the India-based India Foundation for the Arts and the Tata Trusts, as well as the Indian state have all provided support for established and new digital archiving projects. This sizeable channelling of resources is located at a point of intersection between the perceived significance of 'culture as resource' for the strengthening of the 'fiber of civil society, which in turn serves as the ideal host for political and economic development' (Yúdice 2003, 2) and the perceived potentialities provided by digital access to cultural resources for boosting democratic development.

The appeal of reinforcing access to and awareness of local musics through their digital archiving extends beyond institutional contexts and transnational grant opportunities. In the past decade, the permeation of consumer digital technologies such as multimedia mobile phones and flash-memory recorders throughout rural and semi-urban regions of India has invigorated informal and independent documentation practices, especially where oral musics are central to local imaginaries. At the beginning of my field research in 2011, I was struck by the proliferation of collections, websites and initiatives centred on local oral music traditions in varied parts of India. My interlocutors in these places framed their activities through decidedly local as well as wider concerns about fading music traditions, citing the necessity of recording and preserving those musics that would soon vanish from cultural memory. Not all such collections described themselves as archives; many, however, were concerned with the preservation of what was conceived as 'heritage'. The

ready availability of digital technologies – and, crucially, those for dissemination as well as recording – was a central motivation that synergised these aspirations.

Ethnographically nuancing an aural public sphere

The proliferation of vernacular music documentation in present-day India resonates with what Ochoa Gautier describes as a resurgence of the aural in public sphere processes. In noting the shifting contours in Latin America of public spheres centred on regional musics, Ochoa Gautier observes that in recent decades the sonic has gained particular significance 'for a decentred modernity no longer exclusively (or even primarily) defined by the primacy of the lettered word nor by developmentalist models' (Ochoa Gautier 2006, 804). Vital to this sonic turn, she suggests, are digital technologies of sound recording and dissemination and the possibility of communicating across media platforms. Together, she argues, these common digital infrastructures offer possibilities for displacing the textual and lettered nature of the public sphere in favour of the intensified forms of participation associated with aurality. In India, the turn to aurality, I want to propose, reflects a similar understanding of sonic technologies as facilitating a modernity that includes non-lettered participation and non-metropolitan publics.

It is useful here to visit briefly the theory of the public sphere and its expansion in relation to developments in communication technologies. As is well known, Jurgen Habermas' (1989) historical argument centred on identifying a social realm in which private individuals engaged in rational discourse with the effect of shaping a consensual public opinion, portraying this process as a mainstay of democratic practice. His model has been critically redeployed, partly in the context of deepening media and telecommunication networks, as a powerful heuristic for theorising increasingly diverse and mediated public spheres that may include subaltern voices (Fraser 1990; Scannell 1992; Thompson 1995). Indeed, Ochoa Gautier's discussion of a technologically-mediated public sphere can itself be understood as participating in this redeployment.[14] Two recent directions can be discerned. On the one hand are those who argue that the internet offers disparate publics both greater access to information and the potential for greater political and cultural participation, thus potentially facilitating public spheres at different scales, from the local to the transnational (Dahlgren 2005; Papacharissi 2002). On the other hand is the paradigm of Information and Communication Technologies for

Development (ICT4D)[15] which, conflating notions of information society, social development and democratic participation, promotes the use of ICTs for the benefit of marginalised populations – in the Indian context, with special reference to non-metropolitan, rural populations (Sreekumar 2011). While the conflation of technological and civic participation implied in these conceptions is conceptually and practically problematic, it is crucial to note here how sonic technologies and aural modes of participation can emerge as valuable means both of communication and of participation. In India, for example, several ICT4D projects have employed dense mobile telephony networks in non-urban regions to promote education, healthcare, literacy and citizen journalism through aural-centred applications that allow for communication in multiple languages.[16]

While it provoked fruitful later revisions, Habermas' model of the public sphere has been criticised from numerous directions in recent decades. Critics have pointed to its exclusive focus on the bourgeois male as the normative subject of the public sphere, a focus that implicitly (but glaringly) excludes non-bourgeois classes as well as women; its exclusive concern with textual communication; its assumption of consensus as an ideal, and its disinterest in the challenges posed by social and cultural differences and antagonisms; and its disregard of expressive, aesthetic and affective practices and experiences as critical elements of political mobilisation and participation (Benhabib 1996; Born 2005b; Fraser 1990; Hansen 1993; Landes 1988; Mouffe 1996; Negt and Kluge 1988; Phillips 1995; Warner 2002). Instead, Habermas' critics have highlighted the plural nature of public sphere processes, the existence of subaltern counter-publics, and how they are catalysed by an escalating range of media and communication technologies. It is here, crucially, that Ochoa Gautier's attention to the aural nuances the evolving model. She does so in at least three ways: first, by expanding the notion of the public sphere beyond lettered and textual forms to include sonic and musical communications and practices; secondly, by pointing to the close imbrication of often reflexive discourses about the public sphere and of public sphere practices; and thirdly, by recognising the multiplicity of voices shaping discourses about local, regional and national musics, as well as the discrepancies of power that invariably exist between them.

Pointing to both discursive shifts and novel techno-social practices and imaginaries, the concept of an aural public sphere, then, registers not only the augmentation of spaces (both co-present and mediated) for constituting an extensive range of publics through sonic modes, but also how a wider spectrum of bodies and voices than hitherto – ranging from

transnational institutions to regional and rural communities of practice – aspire to generate such aural publics. The concept is especially relevant for the present study, which necessarily focuses both on vernacular publics and on music as an expressive medium – one that undoubtedly animates aesthetic and affective modes of experience. At the same time, Ochoa Gautier's initial discussion of the aural public sphere stops short of exploring several questions central to this study. They include: In what ways, in addition to augmenting it, may technological mediation nuance public discourse centred on regional and oral musics? In such technologically-mediated aural public spheres, how are particular technologies and technological practices drawn into the circulation of musics? And what kinds of mediation do the circulating musics themselves perform beyond significations of the political (whether in the guise of nation, region or other identity formation) and/or the aesthetic (especially in relation to notions of authenticity)? In short, how can an ethnographic exploration of networks of discourses and sounds nuance theories of the aural public sphere?

Locating the ethnographic field: archives on every street

Because they view digital archiving of vernacular musics as a means of participating in public discourses, the initiatives in my study offer a series of windows onto these questions. As part of my field research in northern India in 2011–12, I connected with several audiovisual archives of vernacular musics. Traversing non-governmental cultural institutions and independent small-scale activities, these initiatives diverged from those state institutions explicitly engaged in representing the vernacular as part of a national culture. However they shared discourses about the significance of vernacular musics as heritage, their gradual loss and the necessity to record what would soon vanish from cultural memory. At the same time, the initiatives were diverse in their histories and structures, and those engaged in archiving expressed a range of relationships with the musics: from practitioners who assumed ownership, to urban activists attempting to limit the effects of their interventions. Furthermore, the vernacular musics at the centre of my research – primarily folk musics in Rajasthan and tribal musics in Gujarat – had distinct symbolic valences in public discourse. While the former have come to represent quintessential Indian 'folk musics' and were recognised for their appeal to national and international audiences, the significance of the latter was as yet primarily political through what were seen as its intrinsic links to tribal cultural identities.

The valorisation of vernacular musics was intertwined with perceptions about what it meant to archive. Implicit in my interactions with the initiatives were a spectrum of notions about archiving: from seeing it as a fundamentally technological practice linked to a concern with the materiality of archival holdings, to conceiving of it primarily as a cultural and political practice focused on musical heritage. The varied archives at the core of this study drew these interpretations together with available resources: where in one case such resources enabled the aspiration to achieve the ideals of international standards, in many other cases resources supported less formal assemblages that often participated in extralegal technological circulation. Regarding the former: as an established audiovisual archive, the Archives and Research Centre for Ethnomusicology (ARCE), an organisation based in the satellite city of Gurgaon in the national capital region of Delhi, regarded the pursuit not just of digitisation but of long-term organisation and preservation of holdings as central to its archiving mission. Such ambitions, however, were rarely at the heart of the myriad less formal, small-scale initiatives that I found proliferating across northern India with the availability of digital technologies. In conversations, ARCE's director, Dr Shubha Chaudhuri, expressed that in regions such as Rajasthan where oral traditions were closely linked to livelihoods dependent on cultural tourism, one could find an outfit on every street that called itself a cultural organisation. Many of them claimed to 'archive' music. But, she asked, where was the archiving? There was documentation and collection, but no thought was given to organisation or preservation. Yet in spite of such limitations in adhering to international methodologies and technological standards, the less formal initiatives paid careful attention both to the selection of specific musics and musical artefacts for archiving, and to the process of recording and documenting these musics as parts of their archives.

Along two axes of difference – one, the location of vernacular musics in institutional discourses, and two, the varied notions of what archiving implied – I selected three clusters of archiving activities so as to 'construct' a multisited field from the 'infinite interconnections and overlapping contexts' that presented over the course of my research (Amit 2000, 6). However, my point of entry into fieldwork on the digital archiving of vernacular musics in India was the ARCE, established in 1982 as part of the American Institute of Indian Studies (AIIS), an American overseas research institute supporting humanistic and social scientific study of South Asia (Patterson and Elder 2010).[17] Over the years, ARCE has developed into an academic institution of international repute,

maintaining one of the foremost audiovisual archives in the country. It holds both analogue and digital collections of more than 25,000 hours of recordings, the majority of which are field recordings deposited by international and Indian scholars and institutions. In the past decade ARCE has been at the forefront in adopting digital technologies, systematically digitising its collection, collaborating with varied institutions on digital dissemination[18] and developing independent projects. ARCE's rigorous attention to archiving practices has given it the status of having specialist expertise in India. Through workshops, consultancies and internships, it provides guidance about international archiving standards and practices to state, non-profit and private projects. It was in its role as a source of expert advice and training that ARCE connected with several archiving initiatives central to my research, among them the Kabir Project and Vaacha.

A second set of archiving activities featured in my study centred on a collaboration located in the small city of Bikaner in north Rajasthan between the local Lokayan Sansthan organisation and the Kabir Project – a media initiative based in the metropolitan city of Bangalore in southern India. Lokayan Sansthan had been founded in the 1990s by local intellectual elites; since then it had sporadically conducted cultural activities in the region. In the past couple of years music documentation had again gathered momentum at Lokayan. At the beginning of my research in 2011, the organisation was no more than a group of volunteers, all men in their twenties and thirties, brought together by their concern to promote alternative values in a fast-urbanising context. The Kabir Project supplied such alternative values and interests, and significantly shaped Lokayan's recent work in Bikaner. In 2011–12, in collaboration with the Kabir Project, Lokayan documented the repertoires of five hereditary women performers of mystical oral traditions in Bikaner. The emerging collection was envisioned simultaneously as part of a Bikaner-based community digital archive and as a component of a curated online archive that the Kabir Project has been developing in the past few years. In conjunction with the digital recording and documentation of these musicians, Lokayan produced CDs of their music based on sessions in local recording studios, as well as organising live performances and regional festivals in which they played.

A third, contrasting initiative at the centre of my research is 'Vaacha: The Museum of Voice', a museum-archive of Adivasi or tribal cultures located in the small village of Tejgadh in the hilly tribal regions of Gujarat state. Intended for local audiences as well as visitors, Vaacha is part of the Adivasi Academy, an educational institution concerned with research on

tribal questions. The Academy was established by Sarv Bhasha Trust under the leadership of scholar-activist Ganesh Devy in 1999 and is connected to national and international networks of tribal-identity-based alliances concerned with the promotion of tribal rights; to this end, it involves Adivasi personnel in key organisational positions. In this context, Vaacha was conceived as a subversion of the standard museological gaze: an initiative in which Adivasi curators would themselves utilise the techniques of colonial ethnography in a counter-movement, developing a museum-archive based on the self-representation of Adivasi culture. Audiovisual collections at Vaacha initially began with the gathering and storage of commercially available cassettes and CDs of vernacular musics produced in the region. But the project soon expanded into documenting oral musics with a newly bought MiniDV camcorder and a small digital audio recorder. This documentation has subsequently been utilised in developing a set of audio CDs, a digital museum interface and a digital music map of the region.

Facilitated through complex associations between actors separated often by very large geographic distances and different spheres of influence, the three initiatives that I focus on in what follows demonstrate the varied manners in which digital archiving both participates in the creation of, while itself being shaped by, aural public spheres. Digital archiving activities draw recorded and archived musics into discursive and sonic practices centred on ideas of belonging and of identity, in this way mediating macrosocial relationships between the urban, the regional and the national. Such activities engage a range of subjectivities in the roles of archivists and are rooted in diverse motivations – academic research, alternative cultural nationalisms, questions of identity – as all of these are entangled in aesthetic appreciation. By placing 'heritage value' on vernacular musics, they attempt to formalise links between collective, sonically-embodied memories and the construction of history. Moreover, through decisions about which musics may be disembedded, abstracted and resignified through their recording and circulation, and with what intent, such activities invariably enact epistemologies of purification, discursively and sonically isolating vernacular musics from other aspects of lived sociality.

In the following sections I elaborate individually on the three initiatives introduced. In each case, archiving and associated activities are tied into distinctive institutional contexts and technological practices, and incite different questions (indeed, the concerns I address below respond to the specific fieldwork that each site afforded). I attend primarily to acts and moments of music's documentation, complementing

recent ethnomusicological studies that focus largely on the role of technologies in the repurposing of archival collections among 'cultural heritage communities' (Landau and Topp-Fargion 2012, 126).[19] One intention in doing so is to trace, through archiving activities, the reconfiguration of relationships between musicians, archivists and musics, political and economic entities, and projected affective communities, thereby gaining insights into new investments of power, persuasion and affect in these musics in present-day India. A second aim is to explore the diverse usages and meanings that technologies accrue in each setting, emphasising a movement away from technological normativity, closely associated with international archiving norms, towards a concern with the technologies' performativity and social embeddedness. In these ways I point not only to the intensification of sonic circulation and public discourses on vernacular musics – Ochoa Gautier's aural public spheres – through technological mediation, but also to the very imbrication of discourse about technologies and their affordances in such spheres.

The academic archive: Archives and Research Centre for Ethnomusicology in Gurgaon

My fieldwork at ARCE took in one of the leading audiovisual archives for ethnomusicological recordings of musics in India, including classical, vernacular and commercial forms. Its very existence was rooted in a paradigm espoused by international cultural agencies in the late 1970s in which scholarly documentation was expected to be made accessible in the country of research. ARCE's primary purpose was to maintain audiovisual recordings of Indian cultural forms made by American and other foreign scholars for users within the country. In its dual role as an archive and research centre, ARCE had two explicit objectives: collecting audiovisual recordings focused on performing arts in the Indian subcontinent, and stimulating the academic discipline of ethnomusicology in India. To this end, over the years, it had developed a comprehensive archive and library, now housed in a specially designed space in AIIS's Indian headquarters in Gurgaon. ARCE's main collections of vernacular music consist of field recordings compiled from deposits by scholars and collectors. The centre has also engaged in projects for ethnomusicological research and field documentation.

As an archive with holdings of Indian vernacular musics, ARCE occupies a key position in a network that combines international

discourses in academic and funding domains about the significance both of archived musics and of particular modes of archiving; its participation in these discursive networks shapes its institutional and technological practices. The centre is modelled along the lines of field recording archives at North American universities, shaped crucially by the involvement of several American scholars from its early stages.[20] Since the mid-1980s, ARCE's director Dr Shubha Chaudhuri together with its longstanding technical officer, Umashankar Manthravadi, developed workflows and policies that adhere to international standards in their rigorous technological approach and clarity in acquisition, cataloguing and permissions, while also attempting to innovate (Chaudhuri 2004).[21] In interacting with scholars and musicians, preserving archival material and making it available to a range of audiences, ARCE has carefully considered questions related to the ethics of access and dissemination, archiving technologies, and legality regarding intellectual property rights, while also addressing the specific contexts of musics and musicians in India, especially with regard to metadata creation.

That its ability to maintain exacting archiving standards is appreciated by international patrons is evident in the several grants ARCE has received over the years from powerful international organisations such as the Smithsonian Institution and the Ford Foundation. Given the paucity of rigorous models for archiving in India, ARCE is known nationally for its specialist expertise, sharing its methods and providing guidance to state, non-profit and private projects through workshops and consultancies. This role has been reinforced in multiple ways. Dr Chaudhuri, widely agreed to personify the vision and perseverance underlying ARCE's success, frequently serves internationally as a consultant on topics such as archiving and intangible cultural heritage. From 2007 to 2012, ARCE received a Ford Foundation grant that allowed it to train archivists in audio and video digitisation, making available paid internships for employees in other archives in India. In 2009, it organised a workshop on intellectual property for Indian archives so as to initiate a conversation about specific experiences as well as IP norms with international agencies like WIPO and UNESCO.[22]

Until the late 1990s, global perceptions about audiovisual archives saw them primarily as repositories for the protection and maintenance of historical recordings for posterity. However, in the last decade such perceptions have changed, foregrounding the responsibility of audiovisual archives to disseminate and make available their holdings for public access in the present. Indeed, as the justification for economic support for archiving became linked to access and dissemination, so the digital

component became increasingly crucial to archiving activities and policies. In parallel with this wider shift, ARCE began to engage actively with digital technologies both in its work with musician communities and, it was envisaged, as a means of communicating with national and global audiences. ARCE was one of the core partner institutions to contribute to the inaugural collection of the Smithsonian Global Sound, an online music store launched in 2005 by the US-based Smithsonian Folkways.[23] Subsequently, ARCE itself developed several independent projects that incorporated digital dissemination modes including CDs, websites and mobile phone applications (with the CD series *Remembered Rhythms* (2005), for example, available in India on the Underscore Records website and as downloadable tracks on the Smithsonian Folkways website).

While providing access to archival holdings, primarily to field recordings, continued to be a central concern at ARCE, the ease of dissemination in the digital context also implied the need for careful attention to intellectual property rights and permissions. In contrast to many established and less formal archives in India with vernacular music holdings, ARCE has been at the forefront in addressing the location of the rights of vernacular musicians. In all of its documentation and dissemination activities the aim has been to ensure ethical and equitable remuneration, the seeking of permission for access and the sharing of archived material with source communities. ARCE carries forward these concerns into the digital context: where digital dissemination technologies often expand the networks of music's circulation, ARCE adopts a cautious and restrained stance in regard to the potentialities of the digital – an approach undoubtedly shaped by its negotiations with academic and legal bodies.

ARCE's Archives and Community Partnership: collaborating with communities

In the early 2000s, ARCE sought to channel its concerns about its responsibilities as an archive into the development of a novel project through which music documentation and research could benefit the communities of practice whose performances were being recorded and archived. The resulting Archives and Community Partnership (ACP) project grew out of ARCE's long-term involvement with musicians in the Rajasthan region, especially its collaborative work collaboration with Rupayan on the Manganiar repertoire as part of a grant with the India Foundation for the Arts. In retrospect, this work had coincided with the

growing influence of UNESCO's Convention for the Safeguarding of Intangible Cultural Heritage (2003b), which redefined intangible cultural heritage as inhering in tradition-bearers or communities of practice rather than in abstracted cultural artefacts. The ACP was conducted between 2008 and 2011 in two states, Rajasthan and Goa. Digital technologies for documentation and dissemination played a critical role in the crafting of the project.

Funded by a Ford Foundation grant, the ACP was conceived as a partnership or collaboration that allowed ARCE to approach musician communities in order to initiate community-led archiving activities, while taking on the role of technological facilitators and assuring archival preservation. As part of the ACP, ARCE facilitated communities in identifying musical practices they regarded as valuable and trained community members in audiovisual documentation. The resulting collections were intended to instigate local community archives as well as being archived centrally at ARCE, while digital dissemination would occur through both online and offline formats.[24] Integrating a wide range of actors, the ACP wove together disparate perspectives on the value of particular musics for archiving and on the relevance of the ensuing archives. While the ACP attempted to address crucial questions to do with traditional livelihoods, cultural appropriation and the politics of such interventions by cultural institutions like the ARCE, it was striking that the project also reproduced, at least partially, the very hierarchies of social and cultural power that it was charged with mitigating.

The transnational funding for the project emerged from a valorisation of vernacular musics stimulated by a burgeoning discourse on 'pluralism' in the Ford Foundation. Dr Chaudhuri traced the conception of the ACP to a conversation with Dr Ravina Aggarwal, the programme officer at the Ford Foundation in New Delhi at the time. While the Ford Foundation had changed its grant policies for India by then to exclude funding for cultural documentation, it supported grants that encouraged pluralist models of democracy. ARCE's proposed work in Rajasthan and southern Goa fell within this framework of pluralist traditions.[25] Interpreting pluralism in the Indian context as religious syncretism, the ACP in both places therefore focused on musical practices lying at the boundaries of mainstream religions in India.[26] The hereditary Manganiar musicians in Rajasthan were Muslim, but were customarily affiliated with Hindu patrons with a repertoire that included Hindu devotional music. In Goa, with its history of Portuguese colonisation, the focus was on musical practices of the Gavdas, Hindu communities that converted to Christianity, but partly reconverted to Hinduism in the early twentieth century.

If the Ford Foundation's emphasis on pluralism operated as a powerful incentive to identify such musical practices as ripe for abstraction through the medium of an academic archive, ARCE was attempting at the same time to respond to wider debates in museum and heritage studies by limiting its external intervention in 'producing' heritage and, instead, fostering community-led archiving. In practice, the project included shaping the archival agendas in consultation with practitioners, while engendering in them a reflexivity about their own musics. Intending that archiving should emerge as locally sustainable after the completion of the ACP, ARCE planned to train local archivists in the more technical aspects of documentation and research.

Given the considerable differences between the social locations of music in the two ACP sites, the collaborative approach had distinctive implications in Rajasthan and in Goa. For Manganiar and Langha musicians in Rajasthan, particularly due to the work of the influential Rupayan Sansthan over several decades, archiving was experienced as inextricably linked to producing new modes of livelihood in the context of the declining customary patronage for musical performances. The investment in music archiving was understood by musicians to be multilevel: as creating a historical record in the context of changing performance repertoires and milieus; as serving pedagogic purposes; and as having the potential to enhance the publication of their music. In contrast, none of the three Gavda communities in Goa were occupational musicians; moreover, the musics targeted for archiving were embedded in Gavda ritual practices and were very infrequently connected to their livelihoods.[27] The ACP-related process of documenting and archiving threw newly into relief questions of community rights over the music, modes of remuneration, and which performers merited being recorded. Where musicians in Rajasthan had long internalised an archiving paradigm, the Gavda communities in Goa were less concerned with documentation and preservation. They had little interest in the process of recording, in acquiring recordings for their collections and in wider dissemination. Given this history, ARCE's intervention with the ACP in Goa had limited impact in introducing an archival sensibility[28] or in engendering a technologically-mediated aural public sphere, just as it failed to transform the local ontology of embedded ritual musics into one in which music is experienced as ripe for disembedding, documentation and circulation.[29] The capacity to develop an aural public sphere, in this situation in which the initiative came from an alliance of national and international organisations, was occluded or resisted locally by the prevailing Gavda musico-social ontology.

While one of the primary goals of the ACP project was to develop local archival infrastructures from which the target communities would benefit, the ideals did not always materialise as desired. In Goa, the disinterest of musician communities resulted in the gradual petering out of archiving activities. In Rajasthan, ARCE had partnered with the Manganiar Lok Sangeet Sansthan, a one-man community archive established by musician Kheta Khan Manganiar in the tourist town of Jaisalmer. Khan explained his interest in archiving as a response to participating in intensive research on Manganiar music by visiting foreign scholars and his concern that the results were largely inaccessible to the community. Similarly to the motivations underlying Vaacha's activities in Tejgadh (below), his archive was an attempt to build a repository of emic knowledge that would be locally available and could be deployed to pedagogic ends. Several years prior to his participation in the ACP, Khan had begun to develop his own archive of audiovisual recordings, photographs and ephemera centred on the cultural practices of the Manganiar community. With the help of ARCE, he gradually acquired a computer, a MiniDV camcorder and a mobile phone for audio recordings, creating a small collection by recording interviews with master musicians, as well as music lessons and ceremonies in the community.

If Khan appeared to draw on academic discourses about the significance of Manganiar music, his political concerns with access (where the archive would be located) and representation (who may speak for the Manganiars, and through which forms of documentation) had emerged from his lengthy personal experience as a research assistant to foreign scholars. Through the creation of his own archive and through his participation in the ACP, he was attempting simultaneously to claim agency over the knowledge that circulates externally about the Manganiar community while reinforcing his role as a mediator both of music and of knowledge within the community. The success of his archive, however, was difficult to ascertain. On the one hand, the limitations of Khan's technical and research skills impeded the creation of an archive that could be used widely as a research resource; his limited literacy in English meant that managing and organising digital files on his computer posed serious challenges. On the other hand, not all Manganiar musicians appeared to agree with his conviction about the necessity of community-based archives. For most Manganiar musicians it was easier to accept an external institution such as ARCE as the central archival authority. In this instance, then, local social relations overrode and were not conducive to the participatory model of archiving. It appeared that Khan's relationship with ARCE, his access to technologies and resources, and his claim to

cultural expertise caused tensions with other musicians and community members and risked his marginalisation within that community.

ARCE's activities in India and projects like the ACP throw into relief the ways in which international debates about the dissemination of vernacular musics – for example, perceived obligations to make archival recordings of vernacular musics relevant in their communities of practice, or the demarcation of particular musics as heritage – are increasingly conceived as tied to local archiving practices. It is clear that such discourses – themselves dimensions of transnational aural public spheres reinforced by international funding and mediated by new technologies – shape national and regional understandings of the value and symbolic significance of vernacular musics. Yet, as evident in different ways in the ACP experiences in both Rajasthan and Goa, the effects of such interventions are neither predictable nor straightforward: crucially, they depend on how local ontologies of music, as well as the social relations within which music is locally embedded, meet the imperatives bound up in archiving as a now-paradigmatic relationship with music. ARCE's ACP project therefore indicates that rather than archiving being a neutral, merely technical practice serving putatively universal values, whether of cultural preservation and heritage, or pluralism, archiving itself depends on investment in and inculcation into a certain techno-musico-social ontology. If transnational and national institutions are jointly invested in promoting the expansion of aural public spheres through digital archiving, it is clear from this study that locally, such investment can be far more ambivalently received. In this way, the study points to ironies at the heart of UNESCO-based approaches to intangible cultural heritage that stress embodied communities of practice while still involving practices of recording and archiving.

The collaboration between Lokayan Sansthan and Kabir Project in Bikaner, Rajasthan

A second initiative, a collaborative project in the small city of Bikaner, also in Rajasthan, foregrounds another facet of the interfaces and potential disjunctures between transnational, national, regional and local aural public spheres in which the archiving of vernacular musics is entangled. In contrast to ARCE's normative interpretation of archiving, moreover, it allows insight into the ways in which archival collections can emerge through local techno-socialities, as well as how they are imbricated in existing social hierarchies.

Founded in 1997 by local professors and teachers, Lokayan Sansthan is a public charitable trust committed to documentation of and research work on the traditions of the Bikaner region. Connected to other regional networks of cultural activism in Rajasthan, Lokayan is illustrative of the plethora of culture-centred non-government organisations that has emerged in the state over the past four decades (e.g., Ayyagari 2009). In its initial years, founder members of Lokayan conducted audio documentation of local musicians on cassettes, adding basic annotations of performers and genres. The period since then was interspersed with activities including further recording, educational events about cultural forms, work with traditional craftsmen, surveys of artists in the region and so on. Lokayan's activities for several years had been regional: funded mainly by its members, it also sought support from local institutions and Rajasthan state cultural agencies. In recent years, it has revived its music-archiving activities with the increasing involvement of a new generation of local cultural activists. Unlike the earlier generation, who were primarily intellectuals, current members include some who are themselves involved in performance arts such as Naval, a musician, and Jaideep, an actor. Chief among them is Gopal Singh Chauhan, an energetic young Bikaneri inspired by Gandhian ideals of rural community life who is keen to research and revitalise local traditional forms. Lokayan's recent work with musicians in Bikaner is significantly influenced by Gopal's involvement with the Bangalore-based media initiative, the Kabir Project.

Unlike ARCE, Lokayan is not on the obvious routes that users of folk music archives travel in north India. In fact, my own connection to it was established circuitously, through the nationally-renowned Kabir Project. Partly funded (again) by the Ford Foundation, since 2003 the Kabir Project has worked with vernacular musicians in central and north India under the leadership of documentary journalist Shabnam Virmani. At the heart of the project is the figure of Kabir, a fifteenth-century saint whose philosophies addressed the conflicts between Hindus and Muslims of his time. Associated with *nirgun* devotion,[30] Kabir's poetry speaks of interfaith harmony, universal love and equality among human beings through metaphors rooted in his experiences as an illiterate weaver. Over the past century, Kabir has been brought within the canon of Hindi literature and philosophy through textual and audiovisual compilations. But at the same time, poetry attributed to Kabir continues to participate in oral music traditions of lower-caste Hindu and Muslim communities across north India, among whom he is revered as a saint. Importantly, performances of these oral traditions in several regions of Rajasthan, since they customarily unite Hindu and Muslim devotees, are regarded as spaces that potentially transcend religious boundaries and heal religious divisions.

The Kabir Project was conceived as highlighting this vernacular domain of anti-sectarian practices in response to escalating religious conflict, especially an exceptionally gruesome series of riots between Hindus and Muslims in Gujarat in 2002. Music's affective capacity – 'the power of song' – to animate the message of pluralism was a key inspiration. In the past ten years the project has produced four documentary films, ten audio CDs and several poetry books that present Kabir to national and international audiences (e.g., Ali 2008; Virmani 2008). It is currently developing an online archive to disseminate Kabir-related and *nirgun* practices in multiple media (audio, video and texts). While the content of this archive will consist primarily of documentation accumulated through the project's media productions, it also draws on collections produced through new community archiving activities, such as Lokayan in Bikaner.

My fieldwork in Bikaner revolved around Lokayan's collaboration with the Kabir Project on a venture that took as its focus five women singers from the Dholi, Sansi and Bhopa hereditary musician communities, all legally identified as scheduled castes. The collaboration included documenting the repertoires of these performers to create a local archive of Kabir songs. Parts of this documentation were also to be curated for the Kabir Project's online archive. In addition, Lokayan had itself produced CDs based on local studio recordings of some of the women performers, as well as organising a seven-day travelling festival – Kabir Yatra – that brought together on one platform musicians of mystic traditions from different parts of India. The stated purpose of the Lokayan-Kabir Project collaboration was to highlight the significance of *nirgun* philosophies in advocating anti-sectarianism; but it also mobilised concerns about the erosion of these mystic traditions in the face of urbanisation, as well as pointing to the tensions caused by fundamentalist ideologies in wider regional politics. The Lokayan-Kabir Project collaboration sharpened its purpose by focusing on women singers of such traditions in the Bikaner region, a category of musician marginalised not only by belonging to scheduled castes but by operating in a rigidly patriarchal context, one in which they presumably faced considerable obstacles to performing on public platforms.[31]

Approaches to archiving in this collaborative project were markedly distinct from those fostered by the ARCE's technological and institutional resources. Notions of the 'archive' were intrinsically shaped by the particular digital technologies at their disposal. Lokayan's earlier cassette-based documentation had been envisioned, according to a founding member, as a seed or kernel that could be used in future for the revival of cultural memory. The notion of generating an *archive* had begun to be

used more recently in reference to the current documentation that, through the Kabir Project's projected online curation, would eventually be made accessible and put into circulation. The archive at Lokayan thus appeared to be conceptualised primarily as an accessible repository. The technical culture of archiving at Lokayan was an extension of its members' practices of consuming music and media technologies. As middle-class youth in semi-urban Bikaner, their technological ecology transitioned fluidly between electric load shedding (regulated cuts in power supply), use of informal and extralegal music markets, and ownership of relatively elite objects such as laptops and internet dongles. Gopal and Jaideep initially began their documentation using a consumer-grade MP3 recorder owned by Gopal. But by the time of my fieldwork the Kabir Project, with its considerable resources as a Ford-funded metropolitan media initiative, had provided them with a portable Sony digital-audio field recorder. The digital archive that emerged was stored on Gopal's Acer personal laptop and hard drive, and was occasionally relayed through email and Dropbox to the Kabir Project's Bangalore office for backup.

Lokayan's archiving activities were conceived in markedly different ways to ARCE's. In contrast to ARCE's preoccupation with the confidentiality of archival holdings, security precautions in online circulation were not of concern to Lokayan; neither, unlike with ARCE, were questions of musicians' permissions or of intellectual property rights. Indeed, the 'protectionist' approach that archives such as ARCE and Rupayan practised was vociferously criticised given that vernacular musics, as a community form, were regarded as belonging in the public domain. Gopal eagerly posted recordings he made for the archive on YouTube and other media websites.[32] Outside the collaboration with Kabir Project, Lokayan members approached local music stores and collectors to source others' recordings of live concerts of regional traditional musics. Such recordings were often made by event organisers without explicit permission from the performers and circulated locally through informal channels. Gopal explained that such digital recordings could very quickly disappear given the rapid trends and changes in digital music consumption; his objective, he explained, was to collect these recordings as part of the Lokayan archive. This extension of the archive beyond Lokayan's direct recordings appeared to take little account of quality, whether in terms of music or recording and mixing practices.

If Lokayan's process of acquiring and building an archive resembled that of a bricoleur's, the Kabir Project's vision of its online archive was differently inflected. Even as it worked with resources comparable to ARCE's, its use of digital technologies was guided not so much by the

former's concerns with legality, access, permissions and metadata, but by the possibilities of encapsulating a range of musical experiences and information online. As described on the Kabir Project website, its archive was to be an '*ajab duniya* [a strange/mystical world], at once a searchable repository as well as a magical space where one could encounter songs, poems, conversations, reflections and artworks that offer insights into the poetry'.[33] Still under construction, the archive was planned as a creative and academic project, crafted to provide access to well-researched and -curated content as well as a multilayered aesthetic experience. Digital technologies – multimedia interfaces, the possibility to include diverse media objects (texts, images, audio and video recordings), and a navigation scheme allowing searchability based on such categories as songs, regions, words and concepts – were central to the curation of this online space. Comparison was made between such a virtual archive allowing fluidity in categorisations and movements across them and the putative ontologies of the folk musics being archived: 'modes and mechanisms of knowledge sharing on the internet … are strikingly akin to the non-authorial, free-flowing nature of the oral traditions'.

The oral vernacular in Bikaner's aural public spheres

The Kabir Project's linking of anti-sectarian (pluralist) ideologies, vernacular domains and digital technologies was supported, as in the case of the ARCE community partnership project, by significant grants from the Ford Foundation, again through its sponsorship of pluralism. Lokayan's involvement in the collaboration was premised on its identification with the musical milieu: a sense of belonging to the music and an advocacy of the traditional craft-based ways of life the music was believed to represent; that is, its critical role as a mediator between the Kabir Project and the hereditary women musicians. For Gopal, localism and a re-examination of Indian history and traditions guided by Gandhian philosophies were inspirations for exploring alternative models of development, and music appeared to offer the potential to foster such alternatives. Indeed, music offered a basis for alternative regional economic development. On the one hand, this approach embodied an antimodernist stance that disregarded not only the digital technologies being employed to pursue Lokayan's vision of music-as-development but, through its community vision of Bikaner, the inequities of customary social hierarchies. On the other hand, Lokayan members sought to address those very inequities through their work in promoting traditional

modes of livelihood, and it was through this discourse of traditional livelihoods that they connected with local musicians.

In spite of such idealism, the discrepancies between the social locations of Lokayan members and the musicians they were documenting were striking. Lokayan's young archivists, while from humble socio-economic backgrounds, were college-educated and connected to cultural activist networks beyond the local. The musicians being documented, in most cases, were middle-aged or elderly women, often barely literate and from lower-caste patriarchal backgrounds. The acute differences in age, gender, social class and caste translated also into differences in technological familiarity. The women musicians were clearly limited in the manner in which they could participate in recordings, making them particularly vulnerable to others' control during moments of technological mediation of their music.

Such discrepancies were enacted musically during documentation sessions as archivists and musicians sought to negotiate the shape of recordings. As archivists, Lokayan members claimed connoisseurship about local musics, taking seriously their curatorial role in deciding what musics and sounds could be included in the archive. They engaged in recurrent processes of selection, carving out an artist's repertoire for the archival record – often at the expense of that artist's opinion. This was evident during the documentation of the music of popular Bikaner musician, Gavra-devi Gosayi. Gavra-devi cut an unusual figure as a blind singer who had rebelled against several social and patriarchal norms. Now in her sixties, she had acquired locally a quasi-saint status. One particular recording session that I observed, planned in accordance with Kabir Project requirements, focused on documenting Gavra-devi's selection of her best Kabir songs. The stark demarcation between Kabir and non-Kabir repertoire in regional oral musics, however, was unfamiliar in the local context. At several points over the course of the recording, Gavra-devi suggested songs outside of her Kabir repertoire with Gopal guiding her back.

Studio recordings for the production of Gavra-devi's CD accentuated such mediation in the crafting not only of the repertoire but also of individual tracks. Reminiscent of Louise Meintjes' (2003) account of studio production of Zulu musics in South Africa, the recording studio emerged in Bikaner as a space of negotiation over musical sounds and technical practices between those with unequal social status and power. Critical aspects of the energy of this genre came from its improvisatory form, interactions between vocalist and instrumentalists, and the open-air contexts of its customary performance. The cramped studio and Gavra-devi's unfamiliarity with studio techniques, skewed the recording

process from the outset. Arguably to assert her role as the lead singer and revealing her discomfort, Gavra-devi sang in a lacklustre way with minimal pauses, rarely allowing the interplay with the accompanying clarinettist that made her live performances so vital. At the same time the archivists, concerned with optimising their rented studio time, often interrupted her improvisatory flow. Later attempts by the archivists, in editing and mixing, to construct fluidity in the recordings and craft them aesthetically for projected 'outside' audiences by deleting what were considered to be 'rustic' aspects of the music were a failure. In retrospect, the project had been an almost impossible one: the archivists' ideal aesthetic model for representing the 'live' and 'interactive' when recording singers like Gavra-devi were the Kabir Project's previous CDs, produced in the professional studios of Bangalore.

In spite of the limited control exercised by musicians in both the recording and archiving of their music, there was a mutually instrumental relationship at stake in their association with Lokayan. Customary patron-musician relationships had dwindled over the past decades, replaced by public concerts of devotional music – *satsangs* – as the main mode of livelihood. Lokayan, through its archiving and linked activities, offered vernacular musicians an expansion of such professional opportunities. Lokayan activists, on the other hand, were busy locating themselves as mediators or mandatory points of passage between local practitioners and the non-profit sector espousing the paradigm of 'culture and development'.

Yet it is important to note that archiving was inflecting an already lively and multi-textured aural public sphere in Bikaner. I was often told that regional oral musics were thriving in live performance contexts, the *satsangs,* and were central to local musical socialities. At the same time, Lokayan's activities in Bikaner emphasised their significance in sustaining heritage. Audiences drew a sharp contrast between live genres and commercial vernacular music produced in local studios and circulating on ubiquitous digital devices. They complained that this latter music was suffused with digital and electronic sounds (especially autotuning), and that the newer lyrics, even in devotional songs, reflected a 'party' spirit. One young studio owner expressed to me his helplessness in creating such music for the market, in spite of his desire to promote more authentic live repertoires with his productions. He described Lokayan's archiving work as necessary, emphasising that '*kuchh karana chahiye*' ('something should be done') for traditional musics, which were in grave danger of disappearing with the diminishing patronage provided by an older generation of audiences.

If the Bikaneris I met readily embraced a reflexivity about music as heritage, the Kabir Project's emphasis on Kabir's poetry, and the political meanings of anti-sectarian pluralism they attributed to it, was a source of conflict among local audiences for varied reasons. Within Lokayan, not everyone agreed with the singling out of Kabir-related traditions as suitable for archiving. For instance, a Lokayan founder member and historian, now only peripherally active, pointed out that his early music documentation had encompassed a much wider range of genres in the region, including ritual songs and devotional musics. The oral traditions of Kabir that were being documented in the present, in spite of stemming from vernacular practices, he said, were in fact a commodified popular genre thriving on regional concert circuits.

Frictions were even more apparent during the Kabir Yatra, a seven-day live music festival organised in February 2012 by Lokayan and Kabir Project in Bikaner and surrounding villages. For urban participants, the musics performed at the concerts seemed to invoke feelings of mystic communion; whereas for local audiences the same performances, which were an integral part of familiar soundscapes, elicited mistrust when, as in this festival, they were mediated by the Kabir Project. Scholars have argued that the popular portrayal of Kabir as 'secular', as transcending religious sectarianism between Hindus and Muslims – a perspective implied in Indian nationalist discourse and also in the work of the Kabir Project – is a systematic negation of social realities, both historical and contemporary (Wakankar 2010). Indeed, much of Kabir's poetry and its metaphors emerge from his experiences in the fifteenth century as a weaver, a caste among those lower in the social hierarchy. To de-emphasise these specificities of Kabir's sociohistorical location and to represent him and his poetry through contemporary ideas about secularism and equality is, then, a misinterpretation. While the Kabir Project has nuanced this dimension in its films, on the whole it has adopted Kabir as a folk saint, interpreting his rejection of caste and religion as a type of secularism. It is this Kabir that the Kabir Project has succeeded in promoting to cosmopolitan audiences.

In Bikaner, however, this romanticised and secular interpretation was sceptically received. In regions of customary practice such as Bikaner, Kabir and related oral traditions continue to be associated with lower-caste devotees, enacting and reinvigorating public memories of social hierarchy and discrimination. Rather than signifying a bridge across religious boundaries, for ordinary Bikaneris the figure of Kabir continued to polarise along caste lines. Some groups from higher castes (not necessarily higher economic class) dissociated themselves from the Kabir

Yatra concerts, at times also deliberately avoiding neighbourhoods from where the music emanated. On the other hand, some lower-caste audiences interpreted the organisation by outside agencies of events centred on Kabir as a cynical and clumsy political move to appease the lower castes. The aim to use Kabir to forge ways of overcoming religious and other divisions met locally with considerable resistance.

From the case of the Kabir-related oral traditions and the Lokayan-Kabir Project collaboration, I draw three points. The first relates to how vernacular music, as an archival object, can mediate how archives are constructed. Lokayan's disregard for boundaries between the legal and extralegal in acquiring music recordings, as well as its peremptoriness in shaping repertoire and individual recordings in the studio, were closely linked to its insistence on viewing vernacular musics as part of a public domain – while also commodifying it. Similarly, the Kabir Project drew on its perceptions of the fluidity of oral traditions in envisioning a fluid structure for its online archive. The second point concerns how aural public spheres are enlivened by the indexical power of vernacular musics that are as interpretatively rich as the Kabir-related traditions in contemporary India. Thomas Turino (1999, 236) points to music's capacity to integrate 'the affective and identity-forming potentials' of its sonic indices, invoking and intensifying extramusical imaginaries. The case of Kabir-associated musics in Bikaner points to the extraordinary, sometimes contradictory or conflictual juxtaposition of investments in vernacular musics – from pluralism, to heritage, to caste affiliations – and how musical sounds affectively stoke such associations among the local and non-local publics aggregated by them. Aural public spheres are therefore potentially fractured and nonidentical, even in affective terms. Thirdly, it was precisely these layers – the varied shades of archiving and related activities, the discourses they spurred and the contradictory meanings inherent in the musics they brought to diverse publics – that together constituted the aural public sphere generated by the collaboration between Lokayan, the Kabir Project and local musicians in Bikaner. This sphere, traversed by the affective negotiation of ideas, is not one of rational communication but rather is characterised by socio-political, technological and aesthetic tensions mediated by the region's soundscape.

Adivasi Academy in Tejgadh, Gujarat

The initiatives discussed thus far centre on Rajasthan, where the value of vernacular musics has been reinforced for decades through connections

between scholarship, archiving, tourism and Rajasthani musics' national and global circulation. The case I discuss next, the Vaacha museum-archive, illustrates the articulation of vernacular musics with political mobilisation. Archiving emerges as a mode simultaneously of constructing and suturing tribal identities and modern technological subjectivities.

The Vaacha museum-archive is housed in the Adivasi Academy in Tejgadh, Gujarat, an offshoot of the Bhasha Research and Publication Centre in the nearby city of Baroda. Bhasha has been engaged since the mid-1990s in the publication of periodicals of educational and creative literature in tribal languages in Gujarat. Through the publications, Bhasha and its founder Dr Ganesh Devy aimed to revitalise regional tribal languages in both daily usage and educational contexts. The larger purpose was to create spaces for marginalised voices to speak and gradually participate in mainstream society without being stifled or assimilated (Devy 2006). The Adivasi Academy, an extension of this goal, was intended to create an institutional context that fostered approaches to tribal research that especially facilitated the participation of scholars from within tribal communities. Over the years the Academy has received grants and funding for cultural, educational and development activities from state agencies, notably the central government's Ministry of Tribal Affairs and the Gujarat state government, as well as international agencies including the Ford Foundation and Prince Claus Fund. The Academy, located in the tribal areas of Gujarat, offers primarily elementary and postgraduate education to regional tribal students, as well as conducting applied work in the fields of education, healthcare, labour and microcredit in surrounding regions. While the museum-archive is only one of the Academy's activities, it is a key site for the reflexive reimagination of Adivasi identity for representation in the wider society.

The evocative name 'Vaacha' – literally, voice or the faculty for speech – reflects the metaphorical and concrete challenges that voice, speech and language represent for the Adivasi Academy. The concept of 'vaacha' in this usage has a dual connotation: it refers to the goal of Adivasi self-representation on the part of tribal groups amidst their sociolinguistic marginalisation while also drawing attention to the signal importance of knowledges predicated on oral modes. The museum was conceived as an initiative in which Adivasi curators would, after studying existing museum models, determine the manner in which to shape both the format of presentation and the contents of the collections that would represent their culture. Given that the very notion of constructing a museum was alien to the Adivasi situation, the project required radical processes of translating knowledges and technical skills across contexts.

The creation of postgraduate diploma courses in Museum Studies at the Academy preceded the development of the museum in 2005 (Tilche 2011). The supplementation of museum holdings with audiovisual documentation began in 2009. At the time of my research, three curator-archivists from the Adivasi Rathwa community were in charge of the museum-archive: Naran-bhai Rathwa, Neepa-ben Rathwa and Vikesh-bhai Rathwa.[34] All three, in their late-twenties to mid-thirties, were graduates of the Museum Studies course.

The documentation of Adivasi songs and music at Vaacha had gathered momentum gradually. Inspired by the museological spirit, Naran-bhai and his colleagues had initially begun collecting Adivasi musics in the form of commercial cassettes and CDs of vernacular popular musics in Gujarati and local Adivasi languages; at the time, they had seen this as the only way of preserving music popular among Adivasi audiences. Soon after, Dr Devy had brought Pune-based vocalist Prachi Dublay to visit the Academy. Conversations at the time – centred on the rapid shifts in Adivasi lives and the impending loss of musical traditions – had led to a plan directly to record and collect Adivasi songs. As a cosmopolitan musician trained in classical North Indian music, Prachi was to help transcribe the songs for publication.[35] The project soon developed into formal audiovisual documentation. On a MiniDV camcorder and a small digital audio recorder, the three archivists, and Prachi whenever she visited, began to record traditional oral music and dance performances in the Adivasi regions of Gujarat. Since 2010 the archive has collected about a thousand hours of digital audio and audiovisual recordings of oral tribal traditions in the region. While the documentation of waning cultures is reminiscent of salvage ethnography, the prominent participation of Vaacha archivists in central roles and the initiation of the project in alignment with wider movements for tribal self-representation and rights as espoused by the Adivasi Academy, reinflects such practices, giving them a different resonance.

Vaacha functioned as an institutional archive; however, given its very different conditions, there were clear contrasts with archiving practices at ARCE. Unlike the environment-controlled spaces of the ARCE archive, the Vaacha archive had neither air-conditioning nor security. The audiovisual collections were housed in a small room at the Academy equipped with two computers and two metal cabinets filled with cassettes, VHS tapes, MiniDVs and hard drives. Concerns about appropriate technologies for archiving were limited to a basic instrumentality about recording and storage. Moreover, expressing a keen sense of ownership about the musics, which derived from the extended Adivasi community

to which they felt they belonged, the archivists found irrelevant any questions to do with intellectual property or gaining written permissions from musicians during documentation. The archive, they explained, was for the use of local tribal communities and most performers had willingly participated in the documentation. In certain situations they had also had to record almost surreptitiously, especially when recording women's songs, since the performer/s, while they were aware of the ongoing recording, explicitly avoided acknowledging it.

As at Lokayan, the conception of archiving as necessarily implying a need for wider circulation was also part of the ethos at Vaacha; locally available digital technologies were integral to this conception. Indeed, in the previous year, the Vaacha archivists had produced a set of eight CDs of their Adivasi song recordings, entitled *Tur* (a type of drum used in the region during auspicious occasions). Some of these sets they had handed to the drivers of shared shuttle vehicles in the region. Their intention was that, similar to vernacular commercial musics, the drivers would play these songs in their vehicles as they transported passengers, inviting passengers to re-record the sounds; as it gained audibility and visibility, the music would repeatedly be replicated and disseminated in ever wider spirals through the mediation of mobile phone users and music vendors, in this way entering larger networks of local and regional music circulation. But online circulation of music was also a vital component of their vision of the archiving project: to 'acquaint the world with the uniqueness of tribal cultures'.[36] In these ways, then, digital archiving of Adivasi music was not so much a practice of storage, protection and preservation, but one that, centred on the digital mediation and circulation of oral vernacular cultures, would create an ever-expanding aural public sphere, with the sounds themselves catalysing, indexing and mediating Adivasi self-representation.

For the Vaacha archivists, music documentation, archiving and sharing through online and offline circulation effected a sonic assertion and enlargement of those tribal identities marginalised from mainstream society, while also stimulating and participating in the coalescence of a larger political community. But as important as musical and cultural self-representation in this context was their direct engagement with technologies as a means of acquiring coevalness with wider Indian society. Archiving in Tejgadh emerged as a multivalent practice that served not only to achieve the goal of music documentation, but also to redress through technological access and the acquisition of skills the chronic material and intellectual inequalities experienced by Adivasi individuals and their communities. In presenting Adivasi music archives

online, the archivists asserted Adivasi identities centred on ideas of culture while also connecting with an imagined community of digital media peer practitioners and sympathetic and interested digitally-mediated audiences. In the process, the very practice of archiving served as a performative assertion of the archivists' location both as cultural mediators between tribal communities and wider audiences and as skilled technological subjects participating in regional and, they intended, global flows.

Conclusion

With activities of recording, archiving and disseminating oral vernacular musics at the centre, I began with two tasks: one was to trace the character of the burgeoning aural public spheres – networks of discourses and sonic practices – in present-day India around these musics. The second was to examine how digital technologies, perceptions about them and technological subjectivities mediated by them are implicated in the diversity of investments in vernacular musics and in the constitution of these aural public spheres. Such intertwining of discourses, technologies, sounds and subjectivities was evident in my research ranging across the Ford Foundation's support for pluralism, which galvanised both the ARCE's community archiving initiatives and the Lokayan-Kabir Project collaboration, to the Adivasi Academy's commitment to self-representation and the assertion of tribal identities through music.

While Ochoa Gautier's (2006) concept of aural public spheres has been productive in exploring this intertwining, what has become strikingly apparent over the course of the chapter is how an ethnographic approach can nuance the concept. Aural publicity, it emerges, is not only about the multiplicity of opinions about vernacular musics, nor the diverse subjectivities that can express such opinions, but is inevitably mediated in each case by a complex nexus of social relations. If musics, through their recording and reification, can be abstracted as public forms and put into circulation, such abstraction is always achieved through recording and archiving as social practices, practices that themselves, as we have seen, are mediated by wider social relations and differences such as those of caste, gender, religion, ethnicity or class (Born 2012). The ARCE as an academic archive conducting the Archives and Community Partnership project, which itself partakes in international circuits, shaped its relationships and interventions drawing carefully and conscientiously upon discourses about collaborative and equitable archiving. In

Rajasthan, the ACP project was nurtured by the relationships ARCE had sustained over several decades, as well as by wider histories of the links between musicians' livelihoods and archiving. In Goa, on the other hand, an ontology in which ritual musical practices are indissolubly social resisted the disembedding of music entailed by the ACP project of digital recording, archiving and circulation, wedded as it is to an ontology of music founded on music's abstraction and on deterritorialised modes of consumption. A close examination of Lokayan's recording practices with musicians in Bikaner, framed by national and transnational discourses of religious pluralism, revealed the imbrication of, on the one hand, philosophies that idealised the vernacular and, on the other hand, the reproduction of historically entrenched social hierarchies based on caste and gender. While for archivists at the Adivasi Academy in Tejgadh – even as their activities were shaped by scholarly, musical and technological interventions – practices of recording, archiving and circulating served as expansive and performative assertions, and institutionalised the self-representation of Adivasi identity.

To take an aural public sphere seriously – to include the nature and implications of musical and sonic circulation within it – necessitates expanding public sphere theory conceptually from a focus on reasoned debate to one encompassing the affective, expressive and aesthetic mediations of political discourse (Born 2005b; Gatens and Lloyd 1999; Nussbaum 2001). Musics not only possess symbolic meanings but also have the capacity to animate embodied memories and collective social and political imaginaries. It is the entanglement of the political, the aesthetic and the affective that was apparent in Kabir-related musics in Bikaner, where the aural public sphere emerges as a particularly intense incubator of discursive and political conflicts. The disjuncture between the idealised pluralist conceptions of Kabir circulated by the Bangalore-based Kabir Project and the lived intimacies and socialities of caste-based experiences among local audiences translated into distinct, potentially conflictual aesthetic and affective experiences. If visiting urban listeners at the Kabir Yatra festival experienced a sense of mystic communion, for local audiences musical practices that were an integral part of the regional soundscape elicited mistrust and cynical interpretations when mediated by the metropolitan Kabir Project. Lokayan activists' apparent commitment to authenticity and faithfulness when recording lower-caste women musicians' autonomous musical practices were contradicted by their attempts to reconstruct an aesthetic of 'liveness' and to purify the vernacular for cosmopolitan consumption. Unintentionally, Lokayan's interventions resulted in a complete disregard for women musicians'

agency in shaping digital recordings of their own songs – a form of digitally-mediated dispossession.

Ochoa Gautier's intention in drawing attention to historical shifts in the constitution of aural public spheres was partly to point to the hegemonic position that metropolitan knowledges enjoy in public discourses and perceptions about regional musics. We have seen the same structure of knowledge digitally mediated, and thus potentially accelerated and expanded, in both the ARCE ACP and Lokayan-Kabir Project archival collaborations with local musicians. And yet, as I have suggested through the comparative ethnography presented in this chapter, digital technologies for recording and dissemination should be understood finally as occupying an ambivalent position in constituting aural public spheres in India. On the one hand, we have seen how social practices of archiving mediated by digital technologies refract, and tend to reproduce, wider, pre-existing social hierarchies and hegemonies, which serve as 'informal impediments to participatory parity' (Fraser 1990, 63). Moreover, full access to what might be called a digital-technological subjectivity for Vikesh Rathwa in Tejgadh and Kheta Khan Manganiar in Jaisalmer – access to and entry into digital technical knowledge, and the potential power of 'voice' that this promises – are severely restricted by limited knowledge of the English language; in Khan's case, the assumption of technological expertise also inadvertently placed him in the midst of a local economy of prestige, stoking local rivalries and envy. While at the other end of the spectrum, ARCE's espousal of international standards and technological normativity were key to its ability to enter and participate in transnational archiving networks – and thus gain global audibility and influence. On the other hand, the chapter has shown how access to digital technologies creates a possibility for diverse groups – most crucially, communities of practice such as the Manganiar and the Adivasi – to approach archiving as an aspirational practice (Appadurai 2003), one that allows not only for self-representation but, potentially, for growing audibility and influence through an expanding aural public sphere and through increasing control over emergent musical economies. Intersecting with novel professional models and social imaginaries of collaborative and equitable archiving, digital technologies catalyse even an established national archive such as ARCE to develop decentralised and collaborative projects – amounting, paradoxically, to institutional support for the potential creation of what might be called subaltern aural counter-publics.

India's oral vernacular domain – the domain of 'living histories' – has been available for more than a century for rediscovery and

reinterpretation in the burgeoning spaces of aural public spheres. Such reinterpretations have been shaped by historical ideologies and discourses, and by powerful political and economic interests, as well as by the evolving technological possibilities for recording and dissemination manifest in various periods. The present digital era is perhaps most remarkable in inviting the participation and self-representation of dispersed counter-publics, as these potentials are catalysed at the intersection between the affordances of digital technologies, the rise of digital heritage paradigms, and how these possibilities are animated in turn by conjunctural social and political currents and movements espousing discourses of identity, regionalism and localism. As I have shown, however, any emancipatory interpretation of the digitally-mediated potentials of aural public spheres must themselves be qualified when considered in light of the social inequalities and ontological erasures that appear immanent in, or that may be (re)produced by, the very social and material practices through which digital archiving of oral vernacular musics takes place.

Notes

1 The India project developed in part as a complement to other projects in the Music, Digitisation, Mediation programme. The intention was to include within the larger scope non-urban contexts and vernacular musics as sites where digital and media technologies are transforming musical experiences. Digital technologies, we expected, would catalyse not only sonic transformations but also new modes of sonic preservation.

2 Scholars from disciplines with varied orientations such as text-oriented folklore studies (Ramanujan 1992), anthropology (Appadurai et al. 1994) and critical postcolonial histories (Chakrabarty 2000; Chatterjee 1993) have drawn attention to the significance of vernacular domains in the Indian context.

3 Cultural institutions and museums worldwide consider the digitisation of their analogue audiovisual collections to be a necessary transition in the basic medium of preservation, as well as to expand audiences (Kalay et al. 2008; Parry 2010).

4 Ochoa Gautier's approach finds resonance in other scholarship that attends to regional sounds and technological circulation in Latin America as revealing of public-making processes (cf. Bronfman and Wood 2012).

5 I rely here on an operative cohesion of oral vernacular musics as a descriptive category that refers to cultural forms that emphasise oral modes of transmission and performance, and a persistent reference to social and musical continuity with the past.

6 The predominant set of laws that mediated the social roles of caste and tribe categories were formalised in the colonial period between mid-1800s and early 1900s. The categories were incorporated into the constitution of India after its independence in 1947 and further amended in the postcolonial period. As legal categories applicable to the colony – and the nation – as a whole, 'caste' and 'tribe' united within them disparate meanings, practices and modes of hierarchy. (On the history of caste, see Dirks 2001; Gallanter 1963. On tribes, see Betielle 1986; Bose et al. 2011; Skaria 1997.)

7 From a museological approach, these textual collections are the antecedents of audiovisual archives of oral musics today. An interlocutor, however, offered another genealogical route for present-day archives: preservation of repertoire over centuries through oral transmission and training of disciples.

8 I must qualify that the academic studies that I refer to here – and that inform my study – are primarily English language writing in India and in Euro-American disciplines.

9 Two academic rationales in drawing distinctions between folk and tribal musics are influential in perceptions in India about oral music traditions. One ahistorical approach defines categories on the basis of the characteristics of musical products: folk music is characterised by its continuum with art musics and its collective authorship, and primitive music by being primarily a ritual and participatory form focused on rhythm and physical movements (e.g., Ranade 1985). A second perspective, drawing eclectically from social sciences and humanities, approaches musical sound through a concern with specific socio-political contexts, histories and communities of practice, while acknowledging the performative and agentive roles that practitioners, patrons and audiences play in classification (Babiracki 1991; Wolf 2000).

10 Such bodies include the national Sangeet Natak Akademi (SNA), the Academy for Performing Arts, established in 1953, regional SNAs located in various states, and seven Zonal Cultural Centers established in the 1980s. Currently, these bodies report to the Ministry of Culture.

11 The Ford Foundation represents an exceptional instance in India of the interest of transnational development organisations in vernacular domains. While Ford's objectives for vernacular and traditional aspects of Indian culture has shifted over the several decades of its involvement, the Gandhian 'rural sector' was always central to its concerns. Leela Gandhi (2000, 69) traces these shifts in Ford's policies since the 1950s thus: 'from modernization to preservation, from urbanization to the village, from cultural nationalism (by proxy) to folk-culture, from handicraft to folklore, from cold warmongering to the politics of the margin, from heritage to innovation, even from utility to art'. She characterises Ford's support for the arts as occurring 'under the alibi, variously, of development, preservation or even the reparative restoration of threatened folk-values ... [and] ultimately, of the urgent need for good and imaginative work' (Gandhi 2000, 68).

12 The Ford Foundation also supported a network organisation for archives of 'expressive culture' named the Archives Resource Community. Since *c.* 2010, Ford's grant-making activities in India shifted away from cultural expressions, impacting archival and documentation projects in the region.

13 In the past decade several state, semi-state and independent archives have begun taking steps to digitise their catalogues and analogue holdings. For some of these archives (including the national All India Radio and Doordarshan archives), digitisation is seen also as presenting the possibility of converting archival holdings into media assets potentially deployable for commercial purposes.

14 If communication technologies of varied kinds – print and broadcast – have long been central to the theorisation of public spheres, the formation of aural publics and public spheres have previously been studied primarily by reference to radio (e.g., Casillas 2012; Savage 1999; Scannell 1992). Ochoa Gautier's concept, it must be noted, refers centrally to discourses and debates *about* the public cultural potentials of aurality as well as to the constitution of publics through aural modes.

15 Even as Ochoa Gautier discusses how developmentalist models no longer primarily define ideals of a 'decentred modernity', national and transnational support for vernacular music archiving (e.g., by UNESCO and Ford Foundation) continues to invoke development as one key objective in the patronage of traditional and indigenous cultural forms.

16 See, for example, CGNet Swara, a voice-based citizen journalism project that relies on an internet portal accessible through mobile phones: http://cgnetswara.org/about.html. Accessed 31 January 2022.

17 The history of AIIS (established in 1961) links academic (classicist) interest in India with the availability of political funding (Patterson and Elder 2010): http://www.indiastudies.org. Accessed 31 January 2022.

18 Such institutions include Smithsonian Folkways/Global Sound, the Ford Foundation and the private broadcaster Worldspace.

19 In recent years, scholars have paid attention to the critical role that digital technologies, especially of access and replication, can play in enabling archives to aspire to connect more collaboratively and equitably with their audiences (Landau and Topp-Fargion 2012; Seeger 2004; Seeger and Chaudhuri 2004). Aligned with developments in museum studies, this move grows out of questions, on the one hand, of social transformations accompanying globalisation (e.g., widespread migration, rising identity politics) and, on the other hand, of ideologies and technologies that challenge archival imaginations. A significant segment of such work

focuses on research archives and collections, examining their relevance in animating cultural memories by initiating locally relevant activities (e.g., Brinkhurst 2012; Hilder 2012; Lobley 2012; Nannyonga-Tamusuza and Weintraub 2012; Vallier 2010). Such scholarship offers valuable insights into how technological transformations may facilitate relationships between music archives and communities of practice and reception. However, the focus in most such studies on research archives informed by ethnomusicological norms prevents them from addressing modes of archive building outside these contexts, and sustains clear distinctions between subject positions such as archives, scholars, performers and publics. The present study augments this paradigm by examining informal, non-normative archiving initiatives.

20 Prominent American scholars who have been closely involved in ARCE at various points in time include Nazir Jairazbhoy (founder), Amy Catlin-Jairazbhoy, Daniel Neuman, Anthony Seeger, Stephen Slawek, Bonnie Wade, Susan Wadley, and several others.

21 For example, recognising that digital archiving would soon be the norm, in the late 1980s ARCE took a pioneering decision to transfer some of their holdings to digital format by using pulse code modulation (PCM) to record audio as digital code on VHS tape. In the past decade, keeping up with current archiving practices, ARCE has been systematically transferring its holdings from analogue and digital media to digital file formats to be stored on a RAID (Redundant Array of Independent Disks) system backup on LTO (Linear Tape-Open) tapes. In 2012, unusually for an academic archive in India, it invested substantial funds in Quadriga: a hardware-software solution for audiovisual archiving that allowed for automated analogue to digital transfers.

22 See: http://www.archiving-performance.org/.

23 Smithsonian Folkways, part of the Smithsonian Institution's Centre for Folklife and Cultural Heritage, is the premier label that produces records of folk and world musics. See Smithsonian Folkways, https://folkways.si.edu/ and Smithsonian Global Sound for Libraries, http://glmu.alexanderstreet.com. Accessed 31 January 2022.

24 In the three years after the completion of the ACP, a beta version of the website linked to the Goa projects has been made available at: http://music-community.in/

25 Globally, Ford was also gradually shifting to an emphasis on digital technologies as a tool for encouraging democratisation and the participation of marginalised populations (FF Annual report 2008). The ACP project, in accordance with this emphasis, while also reflecting shifts in archival discourses elsewhere, included dissemination of new documentation and existing archival holdings to the musician communities as well as to wider audiences through digital modes including websites, CDs and android applications.

26 Pluralism as an explicit discourse was not part of ARCE's institutional outlook; however, Dr Chaudhuri explained that a concern with pluralism aligned with its grounding in the discipline of ethnomusicology and appreciation for syncretic cultural forms, evident in earlier projects such as *Remembered Rhythms* (2005). It was also an intervention in retaining cultural diversity in an increasingly homogenising political climate.

27 On the Gavda communities in Goa, their ritual practices and musics, see Newman (1998); Newman (2001).

28 Members of one community, the Nav Hindu Gavda, expressed that the process of documentation had encouraged performance and validated their cultural practices.

29 Martin Stokes (2002) questions any assumption that all musics aspire to the condition of disembedding and, potentially, subsumption by the 'relentless logic' of capital; he counters this assumption through ethnographic explication of alternative, socially-embedded ontologies of music and non-alienated modes of musical labour.

30 *Nirgun* – devotion to a formless or attribute-less supreme power – and *sagun* – devotion to an embodied supreme power – are modes of worship associated with religious philosophies in India. Kabir is regarded as a *nirgun* saint.

31 While the project sought to highlight the contributions of female performers, it was striking that Lokayan itself was all male. When I asked why, I was told that most girls in Bikaner were more interested in movies and shopping than in cultural activities.

32 Recordings made in Bikaner were also made available through the Kabir Project's YouTube channel, ajab shahar: https://www.youtube.com/watch?v=tMDpe4OXn5M.

33 Kabir Project website: http://www.kabirproject.org/about%20us. Accessed 31 January 2022.

34 In Gujarati, the language of communication in Tejgadh, male acquaintances are commonly addressed as 'bhai' or brother, and women as 'ben' or sister.

35 A performer, Prachi also drew upon her experiences transcribing and recording tribal music when developing her own concerts and albums. In 2012, a collaborative album, *Pratisaad* (literally, resonance) was produced, that juxtaposed recordings by tribal women singers with Prachi's interpretations of the songs.

36 The archive has begun uploading a few recordings at its website: http://www.bhashaarchival.org/Video-SCategories.aspx?id=4. No longer available.

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5

Online music consumption and the formalisation of informality: exchange, labour and sociality in two music platforms

Blake Durham and Georgina Born

Introduction

Over the past two decades, one of the most significant consequences of the digitisation of music in parallel with the growth of the internet has been the wholesale migration of the circulation and consumption of music onto digitally distributed formats. The majority of music consumption worldwide now takes place via mobile devices, while the curation and circulation of music in the developed world occurs largely online (IFPI 2021). The major internet platforms for music's circulation and consumption vary in their technical configuration, licensing structure and legal standing, encompassing licensed digital download retailers such as Bandcamp, subscription-based and advertising-supported streaming services like YouTube and Spotify, and unlicensed or extralegal music file-sharing systems,[1] which have become the target of regulatory and policy initiatives and heated legal debates. Within the licensed sphere, streaming platforms have witnessed a dramatic increase in subscribers in the last decade, sparking ongoing debates over the implications for the platformisation of music consumption (Barr 2013; Prey 2020; Théberge 2015). Meanwhile, BitTorrent has remained the most widely used peer-to-peer protocol for the unlicensed or extralegal

exchange of digital music since the shutdown of the pioneering file-sharing service Napster in 2001 (Pouwelse et al. 2005; Spotify 2013).

In light of this rapidly changing landscape, the research presented in this chapter offers an analysis of these now-pervasive internet-based modes of music circulation and consumption. It does so through a comparative ethnographic study of two contrasting, internationally prominent online platforms: the global commercial streaming service Spotify, currently the most widely-subscribed licensed streaming service in the world, and the 'private', unlicensed and extralegal BitTorrent file-sharing site Jekyll,[2] the unique proposition of which was its participant-assembled archive (or 'index') of a large range of musics in high-quality digitally formatted audio.[3] Participant or user[4] 'curation'[5] is a key component of the organisational strategy of both platforms, such that curatorial labour amounts to one of the main ways of engaging with both systems, as well as generating some of their characteristic socialities. Both platforms also evidence the striking evolution of the ownership of music in digital conditions away from the physical possession of music characteristic of the analogue era to a variety of new forms: monetised or nonmonetised participatory access (for Jekyll), or a rental or lease model (for Spotify). These new forms depend on the capacity of digital media to translate musical sound into apparently 'immaterial' forms – in the guise of a range of digital formats that can instantaneously be copied and circulated widely (Sterne 2012) – in this way rendering music tracks what economists call non-rival goods: goods the consumption of which does not limit their consumption by others. In turn, the potentially unlimited copying and circulation of music via the internet has engendered a series of legal and extralegal initiatives to manage, control, commercialise and/or envisage higher cultural purposes for music's online circulation, and it is this spectrum of developments that we portray in the ethnography that follows.

We focus on the innovative technical architectures of the two platforms, indicating how the material, social, ideological and musical are intimately entangled in Jekyll and Spotify. In both platforms, technical design envisages or configures certain socialities; in the case of Jekyll, it also embodies certain aesthetic and ethical ideals. Yet it would be a mistake to understand the two platforms as without precedent; rather, the sociotechnical architecture of both emerged historically in relation to previous platforms, their development often driven by criticisms of those earlier platforms' perceived technical, legal, social and/or musical shortcomings. In this sense we can speak of a genealogy of the evolving music platforms, of the historicity of these

platforms, and of the path-dependency of their sociotechnical development.[6]

Exchange, labour, governance and the social

The ethnographic analysis presented here responds to three broad areas of theory. In doing so it fills notable gaps in existing studies of music file-sharing, which focus mainly on issues of intellectual property, participant ethics and file-sharing as a type of resistance, and which conceptualise the economic characteristics of file-sharing systems either as gift-like or as subsumed by market economics.[7] In addressing the two platforms we position the chapter in relation, first, to recent debates about free and precarious labour, which arose in response to the pervasive incursion of unpaid and poorly remunerated online practices in many areas of the so-called creative economy. Secondly, we bring the ethnographic material into dialogue with science and technology studies, notably the work of Madeleine Akrich and Michel Callon on the design of sociotechnical systems. And thirdly, we address anthropological theories of exchange and ownership. Spotify and Jekyll are exemplary case studies for enhancing these three literatures. Previous research has rarely considered the sizable commitment of labour mobilised by file-sharing systems; it has overlooked the strenuous forms of governmentality inscribed into internet-based sociotechnical systems; and it has failed to engage seriously with economic anthropology when theorising the exchange practices immanent in music's online circulation. The comparative analysis of licensed and unlicensed spheres of circulation allows us to point both to differences between them and, more surprisingly, to features and mechanisms in each sphere that manifest the influence of the other. Indeed, the chapter's final section focuses on the mutual mediation of formal and informal online music spheres: for we show how the design, exchange practices, socialities and labour forms exhibited by the two platforms should be understood in part as dependent upon and situated in relation to the other.

The chapter makes a first contribution by bringing the literatures on labour and exchange, which have largely developed independently, into articulation. It does this by highlighting a number of ways in which the dynamics of labour and exchange characteristic of online practices are interrelated. Previous debates about the participatory dynamics of online communities[8] have tended to present them either as manifesting the precarious labour conditions of late capitalism, or as offering vibrant

examples of non-capitalist creative production and exchange which are antithetical to monetised economies. Our analysis attempts to transcend the sterile dualism played out in these two positions. The tenor of these debates is a legacy of two papers often considered foundational in theorising the nature of digital economies: Richard Barbrook's (1998) essay on 'high tech gift economies' and Tiziana Terranova's (2000) account of 'free labor'.

Barbrook's (1998, 133) depiction of the gift economy mechanisms of the internet in the twentieth century, which he portrays as manifestations of 'really existing anarcho-communism', inspired a significant body of work in which online participatory movements are characterised as gift cultures, especially in their open-source software and file-sharing manifestations (e.g., Giesler 2006; Raymond 2001). The internet is portrayed in this work as a mixed economy in which fully industrial sectors operate alongside gift subcultures, where individuals freely engage in non-market exchange. Barbrook recognises that online gift economies are distinct from those described in economic anthropology since these 'gifts' do not carry the same sorts of obligations as in classic gift-based societies, nor are they embedded in ongoing social relations. At the same time, he portrays the free labour expended in online gifting not as exploitative but participatory. In contrast, Terranova – in part responding critically to Barbrook – develops an autonomist Marxist-influenced analysis in which online free or unpaid labour is portrayed as 'a trait of the [digital] cultural economy at large' and as indicative of what she calls the 'social factory' (Terranova 2000, 33), wherein capitalist exploitation extends beyond the workplace into leisure spaces. Terranova contends, moreover, that since online communities' existence and activities are nested within wider capitalist formations, this necessarily implies that such online subcultural production should be theorised as a type of labour even when participants do not recognise it as such. Arguing against the 'glamorization of digital labor', she charts its 'continuities with the modern sweatshop' along with the 'increasing degradation of knowledge work' (Terranova 2000, 33).

In the wake of these contributions, both of which fuelled continuing debates (see Ritzer and Jurgenson 2010; Scholz 2012; Skågeby 2010), subsequent studies of online communities typically frame the modes of participation at stake in terms of either exchange or digital labour. They rarely consider labour and exchange as interdependent components of online social formations, as we will propose. The comparative ethnography presented in this chapter therefore overcomes this dualistic framing by arguing that the dynamics of circulatory participation in

online music formations are only discernible by addressing both labour and exchange and their interrelations. Indeed, our case studies make clear that labour is required for the perpetuation of music's online circulation, a process we describe as 'circulatory maintenance': for without ongoing commitments from users to sustain through their labour the musical, technical and social components of both systems, the exchange relations of the networks simply cease to exist. Circulatory labour is therefore required by and in service to the materialities and socialities of digital music exchange, while participants' willingness to contribute their labour derives in part from the socialities engendered by exchange. At the same time, it is the systematic shaping of consumption practices by the design and governance of the two platforms that in turn necessitates both participation and labour.

A second theoretical theme of the chapter ensues: the need, when analysing online music platforms, to probe how shifts in consumption practices are engendered by the design and governance of the platforms themselves. Both Jekyll and Spotify privilege and encourage, or on the contrary discourage or restrict, particular release formats, music genres and aesthetic formations, as well as listening modalities. In Jekyll, for example, ideologies of musical 'quality', in part conflated with notions of digital audio fidelity, shaped which musics could be circulated, effectively excluding not only amateur music production but also certain subaltern musics. Similarly, Spotify's gatekeeping limits the music it makes available to established labels, high-profile independent artists, and artists who have signed digital distribution deals with music aggregators such as Tunecore, in this way restricting access to the vast flows of amateur music production. Here, important perspectives come from science and technology studies. As Madeleine Akrich notes in her analysis of technical design, networks can be 'characterized by the circulation of certain types of resources and the exclusion of other actors' (Akrich 1992: 209). Similarly, Trevor Pinch and Frank Trocco contend that 'technologies are never neutral' (Pinch and Trocco 2002, 309); they generate particular modes of engagement while being shaped by the cultural milieu from which they emerge. Attention to how systems of online music circulation 'configure the user' (Woolgar 1990) speaks, then, not only to the shaping of consumption online but also to the transformation of musical subjectivities effected by digital and online practices. These processes of configuration are central to our ethnography: both the dynamics of circulatory labour and the socialities of online exchange are shaped by strenuous efforts to enrol users and to govern the nature of musical experience.

Earlier accounts of online platforms have focused on the nature of users' engagement and experience (Khondker 2011; Marwick and boyd 2011) or on the organisation and ideology of the entity – whether a company or social movement – behind the platform (Andersson 2009, 2012b; boyd 2008; Burkart 2014; Giesler and Pohlmann 2003; Postill 2011). We bring out a dimension that has hitherto been overlooked: the evolving governance and design of online platforms, in response to changing ideologies and uses, by those involved in their management. This level of analysis attends to what might be called the shaping, or production, of consumption – indeed to forms of governmentality in music's online circulation.[9] This is a dimension hinted at, but not developed, by Akrich in her foundational paper 'The de-scription of technical objects' (1992). Her paper innovates in the theorisation of sociotechnical design in science and technology studies (STS) through its methodological insistence on probing the gap 'between the designer's projected user and the real user, between *the world inscribed in the [technical] object* and *the world described by its displacement*' in actual use (Akrich 1992, 209, italics in original). Although Akrich sets out this conceptual stance, she dwells primarily on the way that technical design projects or configures the user. In her case study of the development of the photoelectric lighting kit, she argues that 'the materialization and implementation of this technical object, like others, was a long process in which both the technical and social elements were simultaneously brought into being … [Thus] the kit represented a large set of *technically designated prescriptions* addressed by the innovator to the user' (Akrich 1992, 210–11, italics in original). A later elaboration of this theoretical stance occurs with Michel Callon's work on the constitution of markets (Callon 1998; Callon et al. 2007). Callon and his colleagues emphasise the importance both of economic expertise and of 'material devices' (*agencements*) – shopping carts, mathematical instruments, telecommunication devices – in the distribution of agencies that together configure 'what trading is (and what traders are) in financial markets' (Callon et al. 2007, 3), that is, in designing and performing markets.

The ethnography of Spotify and Jekyll presented below responds to the methodological challenges set out by Akrich and Callon, while extending their perspectives in several ways: most obviously, by probing how gift-based as well as market economies are designed and managed, and by emphasising how the labour of users is designed into such arrangements. But we go further than Akrich and Callon in anatomising the intricate socialities set in motion by Jekyll and Spotify as sociotechnical systems, and by extending their approach to meet the

particular properties of internet-based assemblages. For rather than static and closed 'technical objects', assemblages like Spotify and Jekyll are characterised by their multiplicity, mutability and mobility; they continually evolve in many of their dimensions, including the modes of governmentality that they embody (Rose 1996). This study therefore adds to research on online music platforms analyses of how design projects and constructs users, of the negotiation between projected and actual users, and of the evolving governance of music consumption online.

A final theoretical thread running through the chapter follows directly: it concerns the distinctive forms of exchange and sociality animated by Spotify and Jekyll. Here we bring new media debates into dialogue with anthropological theories of exchange, contributing to the momentum created by a series of key anthropological texts (Hann 1998; Humphrey and Hugh-Jones 1992; Humphrey and Verdery 2004; Strang and Busse 2011). We offer three contributions in this regard. First, we contribute to the ongoing clarification of major categories of exchange – sharing, reciprocity and redistribution (Price 1975; Sahlins 1972; Woodburn 1998) – by disentangling the kinds of reciprocity manifest in the two platforms. Second, we pursue Strang and Busse's interest in the labour involved in construing both possession and the circulation of goods, as well as their insight into the fluidity of ownership and possession as 'social actions rather than … legal categories' and as entailing 'ongoing processes of symbolic communication and negotiation' (Strang and Busse 2011, 4).

Third, we uncover the complex socialities engendered by music's online circulation. If it has long been recognised that property relations are social relations (Hann 1998, 4) or amount to a 'network of social relations' (Hoebel 1966, 424), then it is surprising that analysis of the social relations immanent in particular modes of exchange has not been more to the fore. Our route into this question is the innovative comparison by Caroline Humphrey and Stephen Hugh-Jones (1992) of barter with other forms of exchange. The authors are intent on dispelling any idea that barter is a secondary type of exchange in comparison to gift and commodity systems, which are often depicted as a dominant binary pair (Gregory 1982). Instead, they emphasise how various forms of exchange invariably coexist: thus, 'barter should be seen as one mode of exchange among others', intermingling with 'gift exchange, money transactions, formalised trading etc.', such that 'strategies and obligations in one sphere will spill across into others' (Humphrey and Hugh-Jones

1992, 6). In a further move, Humphrey and Hugh-Jones dwell on the significance of the particular social relations created by barter, contrasting them with those engendered by gift and commodity exchange. If 'in gift exchange, inalienable objects … pass between people already bound together by social ties, … in commodity exchange, alienable objects … pass between people acting as free agents'. Their main insight, however, stems from the contrast between gift exchange and barter. 'Both the gift and barter are modes of non-monetary exchange which derive from, and create, relationships … What differentiates them is the compulsion and "contrived asymmetry" of the gift, as opposed to the relative freedom and balance of barter' (1992, 18). If 'the compulsion of the gift … lies in forcing [the recipients] to enter into debt', they argue, 'the presence of desire [for the objects exchanged] in barter … suggests its own solution – the exchange – which nullifies demand' (1992, 18). 'In a sense', they conclude, '*the very aim of barter is to create and quench desires in oneself and the other. This is what the relationship is about; it is not a mode of negotiating something else (obligation, domination, ostentation, etc.)*' (1992, 18, italics added).

It is here that we depart from Humphrey and Hugh-Jones, for despite their compelling discussion of the distinctive social relations produced by barter and gift exchange, in contrasting the two modes of exchange they stress with regard to barter, finally, only the instrumental telos stemming from the 'interest which each side has in the object of the other, an interest which is satisfied by the transaction' (1992, 7). In this way they overlook their own insights into the fundamental significance of the social relations of barter, which they depict as discontinuous and unstable yet often repeated, as involving 'interaction with dissimilarity' (1992, 11), and – crucially – as entailing the *creation of a sense of equality*. Thus, 'the very act of barter exchange creates equality out of dissimilarity. It does so because the bargain that is struck is that which satisfies either partner' and in which 'the aim is to end the transaction feeling free of immediate debt' (1992, 11). Our comment is that Humphrey and Hugh-Jones mistake the instrumental, desire-driven character of barter as its primary or only telos; whereas their vivid account of the socialities of barter strongly suggests that – in contrast to gift exchange – it is precisely the creation of social relations of equality, involving an absence of debt and the relatively immediate resolution of any obligation, that may be as much the telos (and pleasure) of barter as the objects exchanged.[10]

Our conviction, then, which we develop below, is that the socialities of particular modes of exchange may be as existentially central to both the experience of and the value derived from such exchange systems for participants as are the objects – here, music – possession of which is putatively the driving motive for exchange. Thus, a striking feature of the ethnography presented here is how two online music platforms embody distinctive types of sociality. These socialities, we might say, amount to fundamental elements of the experience of online music consumption systems, and they stem largely from the different ways that exchange is configured in the two platforms, not least by their materialities – which are immanently involved in the genesis of social relations. Particular forms of exchange and sociality are, then, configured by the design of the two platforms. Moreover, as we pointed out earlier, labour is elicited by both of the platforms, and users' willingness to contribute their labour appears to derive in no small part from the pull of the socialities engendered by each system.

Against this background, we begin the ethnographic presentation by contrasting the distinctive identities, social and technical features of the two online music platforms, Jekyll and Spotify.

Jekyll and Spotify: two music circulation platforms – an overview

Jekyll

Jekyll was active for over eight years and was one of the most prominent private unlicensed file-sharing services online, with over 160,000 active members and 1.7 million active 'torrents'.[11] Its avowed purpose as an online music platform was to provide a participatory but disciplined forum for the collection, preservation and distribution of high-quality audio files among those committed to and knowledgeable about audio quality. In a world of proliferating lo-fi digital formats and online music collections of varying standard and dubious provenance, Jekyll conceived of itself as a bastion of quality for connoisseur music consumers. For a significant subculture of participants in the unlicensed, private tracker world who profess audiophilic and archivist tendencies, the platform was renowned as a comprehensive music archive consisting entirely of 'properly'-encoded hi-fi audio. Jekyll therefore embodied a (musical) moral economy, one that aspired to the decentralised curation and preservation, on behalf of future generations, of a world-historical archive

of valuable musics in the highest possible audio quality.

Jekyll was chosen as an ethnographic case study rather than better-known unlicensed file-sharing sites for several reasons, in part due to the relative lack of research on private file-sharing sites. While Jekyll could in no sense be considered typical of file-sharing platforms worldwide, it represented a symptomatic development: the emergence of a strong countercurrent against wholly decentralised and unregulated peer-to-peer (P2P) file-sharing. Jekyll was emblematic of the proliferation of closed file-sharing networks which limited access to 'trusted' members, sites sometimes known as 'darknets'.[12] The migration to private, highly governed file-sharing spaces that it represented followed a wave of civil and legal actions against administrators and users of unlicensed public file-sharing sites, actions that tempered the growth and vitality of public sites (da Rimini 2013).[13] Jekyll therefore existed within a broader ecology of unlicensed file-sharing sites, one that diversified to include private systems like Jekyll which approached the size and scale of leading decentralised public sites.

The technical basis of the Jekyll platform was the BitTorrent protocol, which was originally developed for the P2P transmission of digital media.[14] Files, whether they contained music or video, were divided into thousands of pieces through users' BitTorrent applications, called 'clients'. They were then made publicly accessible on the internet and distributed in individual pieces to potential downloaders, who served as additional nodes in the network. Once a user completed a download, the BitTorrent client on her/his computer reassembled the fragmented data into its original digital format, as integral music or video files ready for consumption. BitTorrent's decentralised model of circulation, drawn from broader trends in distributed computing, depended on many thousands of participants committing their computers at any one time to fulfilling the functions of a server by reciprocally sharing data with the entire 'swarm': the network of all active users exchanging data on a particular torrent. The protocol was designed specifically to circumvent attempts to police copyright infringement online. The centralised server, referred to as a 'tracker' or 'public tracker', did not itself host any copyrighted content, nor did it engage directly in the distribution of music or video. Rather, it facilitated P2P connections by identifying nodes from which further pieces of files were available. In this sense, the protocol socialised the risks associated with copyright infringement, pointedly highlighting how the software's architecture is at once both technical and social (Born 2013, 31).

Private trackers like Jekyll represented a significant evolution, a second generation, in the ongoing development of the BitTorrent protocol

since they limited and controlled access to their component swarms, effectively enclosing and privatising the erstwhile publics of previous unlicensed file-sharing platforms. In a similar way to public trackers, Jekyll's technical infrastructure controlled the distribution of torrent files through the site index, which listed the music made available by all Jekyll users, while monitoring the swarm so as to facilitate the P2P transmission of data. Jekyll did not itself host music: it functioned as an intermediary, overseeing and coordinating a file-sharing system otherwise entirely supported by the technical resources of its participants. Yet in marked contrast to earlier public P2P file-sharing systems, Jekyll was an intensively governed and regulated subculture: against the informality associated with those public systems, we will see that Jekyll's socialities were highly formalised.

The social relations of Jekyll were marked by exclusivity: the site's index and file-sharing capacities were strictly limited to members. Membership was available through two admissions routes: personal invitation or interview. High-level Jekyll users were able to invite a number of individuals to join and were partially held responsible for the invitee's conduct; improper use of invitations (e.g., inviting untrustworthy individuals or openly selling invitations) was punishable by permanent termination of the recommender's account. Jekyll also allowed account registration through personal interviews run by high-level members. Yet the very demanding interview process excluded certain demographics: applicants from over 30 countries primarily of the global South were banned from the interview route, purportedly due to a correlation between serious violations of Jekyll rules and geographical location. Ironically, this extralegal site invented a system of policing the infringement of its own laws.

Once applicants received permission to register, they were inducted into a 'user class system', which regulated permitted behaviours and bestowed privileges and prestige on participants in the P2P exchange in appropriate manners prescribed by Jekyll governance. Participants' position in this hierarchy was determined by a strict calculation of metrics related to the number of music releases downloaded as opposed to those contributed or uploaded. Reciprocity in music exchange was therefore systematically incentivised and enforced, written into Jekyll's technical architecture and elevated into a governmental principle: any downloading of music had to be matched by uploading music of appropriate size and audio quality back to the system. According to their contributions, members were classified into seven classes, with each class ascension offering new elements of

curatorial and editorial control over their individual profiles, as well as the ability to participate in the maintenance and management of the site's music index. Through a selection process that was concealed from ordinary users, and without any pretence of democratic involvement, users could also be invited to join the Jekyll staff, a subculture that was similarly hierarchised into a further six classes, each with their own responsibilities.

Apart from the formal hierarchies of the user class system, Jekyll's sociality encompassed the competitive pursuit of prestige, with users' status negotiated through multiple facets of their participation. Musical knowledge was highly valued, and particular users came to be recognised as authorities on certain music genres. Such informally designated experts were often called upon in discussions of newly uploaded tracks, and their perspectives on the historical development of a genre and its most significant albums were often written into user-generated 'genre introduction' documents. As well as musical expertise, technical knowledge – especially of digital audio encoding – engendered a parallel economy of prestige: individuals with sophisticated knowledge of digital signal processing and access to high-end audio hardware were expected to comment upon and critique other users' modes of encoding and uploading tracks. These forms of knowledge, along with other markers of distinction, constituted an informal sphere not codified in Jekyll's formal user class system; as a result, prominent members could occupy surprisingly low-class positions due to their relatively weak contributions of the sort recognised by the class system. Together, then, the dynamics of class, status and prestige helped to constitute lively and multifaceted socialities.

Spotify

With over 381 million active users (Spotify 2021), Spotify is currently the most prominent commercial licensed digital music service globally, its popularity indicative of consumer interest in novel modes of music consumption. Spotify innovated as an online music platform by offering a streaming service shorn of purchasable albums or digital downloads. Its catalogue of over 70 million tracks is available on demand via paid subscriptions or advertisement-supported free accounts through its applications for mobile devices and desktop computers. Spotify's business model embodies a shift from the earlier transaction of physical music commodities to a wholly access-based model. In this arrangement, digital music's commodity form is reconceptualised in

the terms of an ongoing mediated engagement between artists, intermediaries and audiences, with a royalty structure that compensates rights holders based on consumer listening data.[15] While the access model conjures up images of unlimited musical availability, we will suggest that it is a move towards a tightly-controlled rentier musical capitalism,[16] in which rather than selling the ownership of physical commodities income is generated by leveraging property rights. This gives intermediaries unprecedented governmental controls over music's circulation, both newer entrants – streaming services like Spotify, as well as internet service providers – and the record companies that dominated previous decades of commercial music activity (Burkart 2008).

Matteo Pasquinelli (2009, 2), writing on Google's parasitic relation to the digital economy, proposes that Google's gatekeeper position over internet search results established it as 'the first systematic *global rentier* of the *common intellect*' (italics in original). As we will show, one of our contributions to the theorisation of rentier tendencies in digital economies is to unveil Spotify's appropriation of user contributions. By appropriation, we refer to the ways in which, in developing its rentier controls over music's circulation, Spotify requires, repurposes and profits from its customers' labour. But there are further implications of expanded corporate rentier activity in online music. Most obviously, the nature of ownership is transformed. If Jekyll offered extralegal methods for possessing music without regard to intellectual property statutes or obligations to rights holders, Spotify requires its customers to engage in temporally-unlimited payments so as to retain a highly qualified state of possession of streamed music collections. At the same time, Spotify catalyses the accelerated circulation that has been theorised as a defining feature of 'a new stage in the history of capitalism' (Lee and LiPuma 2002, 210) – exhibiting music's tendency to be in the experimental vanguard of commerce. One of Spotify's innovations is to closely monitor listening behaviour, for two synergistic reasons: to recommend further music attuned to customers' tastes, thus accelerating music's online circulation; and as the basis for calculating payments to rights holders. The analysis of listening behaviour and the attempt to shape users' experience through recommendation algorithms are, then, distinguishing facets of Spotify's business model; they are deemed to be cutting edge and are characteristic of wider trends in the commercial mining of large data sets – otherwise known as Big Data (Drott 2018a, 2018b).

As a multinational commercial platform proffering individuated,

rent-based consumption, the distinctive socialities configured by Spotify are more elusive than Jekyll's. Nonetheless, Spotify does generate a limited and regulated set of characteristic socialities because music-based social interactions are designed into the platform. This is achieved by integrating elements of external commercial social networking sites (SNSs) – notably Facebook – into the platform. Unlike SNSs, which encourage individuals to expand their virtual 'social network' through multiple expanding connections, Spotify favours dyadic relationships in which users interact with individuals with whom they are already friends (enabled by the alliance with Facebook) or those with shared musical interests, thus incorporating features of 'taste-based SNSs' like last.fm (Baym and Ledbetter 2009). Uniquely, however, the new virtual musical friendships orchestrated by Spotify are developed through users' creation and consumption of publicly-shared, online 'playlists'. This playlist feature of Spotify is the primary means for its design and governance of socialities: it is an implementation of a 'user-generated content' model in which customers are invited to participate in the curation and 'creation' of the very commodities they are paying rent to consume (van Dijck 2009). Indeed, the curation of playlists – whether assembled collaboratively with friends or curated individually for public consumption or private use – is simultaneously the fount of Spotify socialities, a key practice in Spotify's devolved organisation and circulation of music and musical knowledge, and the main driver for its configuration of audience labour.

Agreeing with Terranova, we suggest that this audience labour – a digital strategy commonly referred to as crowdsourcing (Brabham 2013) – along with the socialities engendered around playlist curation and sharing are at once core sources of the pleasure generated by Spotify music consumption and elements in the platform's extended circuit of value production. Of course, following Akrich, while this labour is elicited by the platform's design, users' actual engagements with Spotify are diverse and do not always conform to design projections. Informants often describe their use of Spotify in terms of individual listening, organisation of their music collection, or intimate interpersonal communication, sometimes ignoring or attempting to disable all 'social' features of the service. Nonetheless, Spotify is invariably deemed by its users to offer what is called 'social' music consumption. Later, in accounting for the socialities animated by Spotify, we argue that they are hybrid forms constructed in part through the platform's emulation of practices more characteristic of unlicensed music circulation.

Designing participation: hybridity, reciprocity and ownership

A common feature of Spotify and Jekyll is how both platforms elicit a staggering diversity of participatory practices devoted to music's circulation and consumption, effecting a multiplication of types of labour and exchange. In this section we analyse the nature of this participation, unpacking – with reference first to Jekyll, then Spotify – the progressive rationalisation of online music exchange.

Jekyll: the ratio system, requests and reciprocities

In contrast to earlier public P2P file-sharing trackers, we have shown that, in Jekyll, reciprocity in file-sharing was not voluntary but made compulsory through the platform's sociotechnical design. Jekyll's approach to the enforcement of reciprocity throws light on the particularities of private tracker economies, while revealing how the platform's architecture embodied a response to previous paradigms of online music circulation. The primary mechanism for enforcing reciprocity in Jekyll was the implementation of a 'ratio system', described in computer science literature as an 'asynchronous incentive paradigm' (Liu et al. 2010). The motive behind Jekyll's ratio system can be traced to attempts to discourage what is known as 'free-riding' behaviour, a pervasive problem in earlier informal P2P networks that drove the emergence and widespread adoption of the BitTorrent protocol. Early P2P networks, such as Gnutella and Napster, are widely acknowledged to have suffered 'inefficacies' due to downloaders disabling their own upload capabilities, in effect obtaining music from the network without contributing or distributing it to others (Saroiu et al. 2001). BitTorrent was designed to avoid this problem: it incentivises synchronous reciprocity, since a user's download speed is suppressed if her or his upload bandwidth is limited or disabled, in this way technically eliminating the free-rider problem. Free-riding behaviour, however, also includes failing to contribute an amount of music equal to the amount downloaded, which the original BitTorrent protocol did not address. Jekyll's ratio system innovated by extending the logic of technically-prescribed reciprocity so as to enforce a minimum statistical ratio of uploading (or 'seeding') to downloading (or 'snatching') on all torrents. It did this by monitoring and metricising each megabyte of uploaded and downloaded music for all users. To illustrate: a user who snatched 10

gigabytes of data but only seeded 1 gigabyte back would have a ratio of 0.1.[17] In Jekyll, the prescribed minimum ratio was progressive, growing more onerous as the user downloaded more music.

The anthropologist Marshall Sahlins' (1972) classification of schemes of reciprocity in gift-based societies is useful in unpacking the ratio system, while confirming that Jekyll did not constitute a classic gift economy. Sahlins describes three types of reciprocity: generalised, balanced and negative. Generalised reciprocity refers to gifts granted without immediate expectation or compulsion to reciprocate; balanced reciprocity entails the immediate exchange of equivalent goods; and negative reciprocity refers to the direct exchange of goods such that the parties involved attempt to maximise profits while giving back as little as possible. Early P2P systems such as Napster embodied a sociotechnical ethos akin to generalised reciprocity, in that participants were allowed to download music without any expectation of reciprocal uploading. Unlike gift-based societies, however, where norms oblige recipients to reciprocate in the future, earlier P2P file-sharing systems attracted the 'free-riding' behaviour described, which is broadly akin to negative reciprocity. In contrast, the original BitTorrent architecture established a different exchange paradigm, including an incentivising scheme that resembles balanced reciprocity. In this paradigm, in order to obtain music from the network, music has to be distributed back, with the formal obligation to 'seed' ending at the conclusion of the transaction.

Jekyll's ratio system represented a further stage in the evolution of types of reciprocity in online music exchange. In particular, it introduced novel temporal elements. On the one hand, users' exchange statistics were monitored across the entire lifetime of their account, with ratio statistics being measured in terms of aggregate snatching and seeding, creating ongoing obligations to engage in reciprocal practices. On the other hand, calculations were updated roughly every 30 minutes, acting in this way as a constant reminder of one's ratio. However, each download did not need to be matched by an equivalent upload as long as other torrents were seeded proportionally in order to maintain the minimum required ratio. Users who did not seed enough to meet the required ratio were placed on 'ratio watch': a two-week period in which they were warned that they must balance their ratio to maintain download privileges. If the required ratio was not met during this period, the member's download capacity was revoked. David Graeber suggests that the analysis of exchange relations such as these should be nuanced in terms of relative degrees of openness or closure: the extent to which the exchange either engenders ongoing social relations, including those of

obligation or indebtedness, or absolves them (Graeber 2001, 220). If the tit-for-tat design of the original BitTorrent protocol terminated obligations at the completion of the initial exchange – a quintessentially 'closed' system – Jekyll's ratio system innovated by 'opening up' and prolonging the nature of exchange obligations over time, while at the same time rationalising, speeding up and intensifying the reckoning of users' ratio metric as a kind of continuous disciplinary monitoring. If in gift-based societies the gift and its return must be separated by an interval of time, with the socialities created by such reciprocity being 'intrinsically linked to a mode of temporality that is heterogeneous, contextual and immune to any uniform standard of measurement' (Lee and LiPuma 2002, 202), then Jekyll's ratio system combined an incessant, standardised temporality of reckoning with the extended temporal arc of the global 'lifetime' of each account, the latter rendering Jekyll a kind of imagined social totality.

The ratio system is therefore one of the chief mechanisms by which Jekyll governed reciprocity in music exchange, and thus circulation. But it is also a crucial indicator of the hybrid nature of exchange in such file-sharing platforms. On the one hand, the standardisation and rationalisation of circulatory practices wrought by the ratio scheme speaks to a pseudo-commodification of the torrent economy, casting digital music files as interchangeable and alienable commodities whose 'cost' is directly correlated with the size of the digital file – in effect treating bandwidth statistics as a form of currency. On the other hand, the ratio system's approach to measuring overall uploads and downloads resembled a 'pooling' scheme, a particular 'system of reciprocities' (Sahlins 1972, 188). Here, reciprocity was reckoned in terms not of dyadic exchanges but of users' relations to the torrent community at large, in the guise of total amount of music received versus total amount given back. This aspect of the platform effectively constituted Jekyll as a form of public, one produced through a rationalised hybrid of generalised and balanced reciprocity that was itself sanctioned as a public good. The obligations incurred by downloading a particular track, then, were not to the originator of the torrent, nor to each individual participating in the swarm, but to the system itself and by extension the entire Jekyll 'community'.

Further insight into Jekyll's exchange relations comes from its 'requests' forum, another elaborate governmental mechanism. According to Jekyll guidelines, requests were explicitly designed as a reward structure to assist others in acquiring new music through the incentive to contribute new music to expand the tracker's archive. Users who desired a particular

unavailable music track, and whose ratio was sufficiently positive, could add the sought track's details to the requests index. This index listed all music currently requested by Jekyll members along with the bonus to be awarded to the first user to upload it. Those who wished to see a particular request fulfilled 'voted' by contributing a portion of their available total data uploaded statistics, referred to as 'buffer', to the request page; while the total amount of reward offered by all those supporting the request was referred to as the 'bounty'. Each individual request page contained the track's desired source medium (such as vinyl or web), required digital format (e.g., lossless FLAC, particular MP3 bitrates etc.), and often further metadata and paratextual information. Once a member obtained the requested music release and uploaded the track to Jekyll, the request was marked as 'filled' and the bounty was immediately transferred to the successful uploader's account, often drastically improving their ratio and allowing them to download more music.

In one light the requests system appears surprisingly akin to an autonomous market economy in which ratio, buffer and bounty are components of currency, and where forces of supply and demand dictate the pricing and purchasing strategies of those making the request as well as those fulfilling it. Yet closer examination of actual exchanges in the requests forum revealed a spectrum of dispositions towards exchange, none of which were completely subsumed by orthodox market logics. Perhaps the clearest criterion for classifying requests was the desired track's wider availability in licensed distribution networks: this rested on a distinction between easily procurable and less easily obtained, or obscure, requests. Regarding the former, requests often occurred for music on sale from licensed sources such as iTunes, Bandcamp and the secondhand vinyl marketplace Discogs.[18] Informal norms in Jekyll dictated that requests involving a purchase should carry an appropriate bounty: for a $10 release, a bounty of at least 10 gigabytes was considered obligatory for it to be filled. Consequently, members often discussed socially appropriate 'exchange rates' before posting requests, a clear indicator of a mimetic market discourse in which the ratio system and individual buffers were imagined as units of currency. However, when considering less easily obtained musics such as out-of-print recordings and unreleased tracks, the notion of appropriate exchange rates was not invoked. Instead, the request bounty became less an instrument for incentivising those who could fill the request and more akin to a symbolic indicator of the communal value placed on the request by all those interested in having access to the music. In particular, high-level users would often contribute their 'spare' buffer to the bounty offered for

obscure recordings, even when they had no personal interest in them, in the higher service of expanding Jekyll's archive. For obscure but highly valued musics, then, Jekyll's moral economy came to the fore: requests for rare recordings were commonly filled for minimal reward, and no direct correlation existed between the size of bounty and the rate at which such requests were filled.

The disparity between easily accessible and obscure requests points also to the symbolic capital accruing to obscure recordings and those uploading them, as well as to the socialities engendered by the request system. If some requests resembled commodity exchange – in that payment was made and obligation discharged by the market-like transfer of the bounty – requests for obscure musics generated, above all, ongoing socialities. In practice, then, the reward for filling a request was not reducible to individual ratio gains, for when filling longstanding and difficult-to-locate requests, it is prestige that was at stake. In these cases, requesters often made new social connections with, and expressed gratitude to, request fillers, exploring common musical interests and strategies for sourcing additional tracks. These relations were enacted within the request forum itself, as frequent requesters and fillers quickly began to know the tastes and sourcing methods of other highly involved participants. Moreover, the sociality engendered by such requests spread beyond requester and filler to include others interested in the desired release. Indeed, in some cases the filler of a highly-anticipated release would receive hundreds of messages of gratitude – and corresponding amounts of symbolic capital. An informant active in the request system opined that he rarely considered the bounty sufficient incentive to engage in filling requests; rather, the social and moral dimensions of Jekyll manifest in expressions of goodwill, enhanced reputation and admiration for filling valued requests were the primary motives for uploading.

What is remarkable, then, is how Jekyll simultaneously mimicked the logics of both market and non-market exchange, drawing together complex forms of reciprocity with currency-like mechanisms, as well as market-like equivalences with an economy of symbolic capital. Against Barbrook's depiction of the internet as a vast 'mixed economy' composed of bounded sectors – public, gift-like and commercial – we suggest that Jekyll was neither a gift nor a market economy, but a hybrid. There are no components of the Jekyll system that were either wholly commodified or entirely gift-like: the requests system was simultaneously a marketplace – complete with internal currency and mechanisms for negotiation – and an aspirational 'wish list' where members collaboratively sought out rare tracks, not for individual gain but to enhance Jekyll's musical commons.

Similarly, the forms of reciprocity mandated by the ratio system combined aspects of generalised and balanced reciprocity. The ratio system, finally, represented both the pseudo-marketisation of the torrent economy and a rationalisation of reciprocities, one that inventively shifted the nature of exchange obligations from the dyadic to the communal. It is this entanglement of seemingly contradictory ideologies and practices that constituted the irreducible social hybridity of Jekyll's exchange system.

Spotify: curation as simulated 'exchange', ownership and possession

When addressing the nature of exchange and labour in Spotify, a different hybridisation is evident. As a commercial platform, Spotify's mode of address to consumers is highly individuated via a streaming interface that imitates the personal music library format. In marked contrast to Jekyll, exchange relations and modes of reciprocity are not central to Spotify's sociotechnical design, which effects a shift from the communal to the individuated and dyadic. Indeed, in comparison with Jekyll and previous P2P platforms, in Spotify, exchange, reciprocity and the socialities they engender are severely reduced and curtailed. Yet in order to socialise and enrich the nature of its interface, so making it appear closer to the prevalent nature of online musical experience, Spotify appropriates – by simulating – features of informal P2P music circulation. Hybridisation here takes the form of the simulation of aspects of informal P2P exchange encompassed within a formal, commercial music consumption system. In Spotify's exchange and labour practices, it is the instrumentalisation and individuation of consumption that are to the fore (cf. Virno 2004, 76–80).

The clearest appearance of exchange relations in Spotify occurs through its elicitation of the practice of public playlist curation among its users.[19] This represents an appropriation-simulation of the curatorial practices of unlicensed P2P music communities, while in parallel Spotify restricts the flows of musical objects that would otherwise engender exchange relations. Thus, while the architecture of Spotify allows music's paratexts and user-generated playlists to circulate freely on the platform, generating a certain delimited field of circulation and exchange, access to discrete music files – that is, to the 'music itself' – is centrally controlled and restricted. Users cannot exchange files between them, dyadically or more widely, nor can they contribute or add uncatalogued releases to Spotify-sanctioned playlists. This radical enclosure of the circuits of digital music flows is necessitated by Spotify's rentier model, which depends upon the privatisation of musical sound while monitoring and monetising each

'listen'. Spotify thus oversees a two-way movement: a drastic reduction of exchange relations in music's online circulation accompanied by the simulation of such exchange relations via playlist curation.

The creation of playlists is the most common way to organise musical 'content' in Spotify, both for private consumption and as publicly searchable collections curated by users and staff. Playlist curation is therefore a key means for users to manage the music that they stream. At the same time, when made public or 'shared', such playlists embody Spotify's core strategy for devolving the organisation of its 70+ million 'song' catalogue (see Drew 2005). The breadth of musical knowledge made available through public playlists is extraordinary, and for our informants it undoubtedly represents one of the most significant and valuable features of Spotify (cf. McCourt 2005). Playlist curation is, then, central to the mutual value creation that is the putative objective of Spotify crowdsourcing strategies – a conduit for transforming cognitive and affective labour into exchange value. Clearly, it amounts to a type of free labour, exemplifying Terranova's analysis of labour practices that 'have developed in relation to the expansion of the cultural industries and [that] are part of a process of economic experimentation with the creation of monetary value out of knowledge/culture/affect' (Terranova 2000, 38).

While playlist creation practices vary widely, the case of one advanced Spotify user illustrates the demanding labour involved in assembling a personal collection. MF, an avid digital music collector and amateur musician, possesses an MP3 library of several terabytes, some 175,000 'songs', in addition to his Spotify account, which numbers in the tens of thousands of tracks. MF explained that Spotify now accounts for almost all of his personal listening, but demanded a substantial investment of time and creativity when he first joined five years ago. Deciding to use Spotify in place of his MP3 collection required him to completely reconstruct his 'essential' personal music library, which was accompanied by the constant addition of newly discovered musics. He continues to add full albums to a series of nested 'library playlists', which are intended not for listening but as a means of adding the files into his personal Spotify collection, from which new playlists could easily be constructed.

At the same time, the curatorial labour of playlist creation is a key source of the socialities enlivened by Spotify participation. MF is again illustrative: his playlists vary in theme and are organised around conceptual, aesthetic, generic and functional as well as personal criteria. Many are named after friends, curated as a musical rendering of a friend's personality and tastes. These personalised playlists are occasionally shared with friends by email, but more commonly shared by listening

offline to a playlist together. Indeed, MF's organisation of his Spotify account is pointedly designed with other listeners in mind; he spoke fervently of the importance of copresent listening with friends, and of the musical-and-social relations produced through browsing friends' collections. For MF, the significant investment of time and labour in assembling a coherent collection in Spotify is not considered work: it affords a mode of music consumption unlike previous platforms, and the expenditure of time and effort is experienced as a rewarding act of musical self-creation. More generally, Spotify use depends on customers like MF contributing their curatorial labour so as to programme what are considered to be coherent listening sessions, putting users' creative participation to work while simultaneously adding value. Not all Spotify users curate personal playlists or assemble personal collections, however, relying instead on the playlists of others. Another informant, RS, uses Spotify solely at work to listen to a playlist of ambient music imported from iTunes. At home, in contrast, she selects music, depending on the event or mood, from her mixed physical-and-digital collection consisting of CDs, MP3s, vinyl records and cassette tapes. For RS, the time required to recreate her personal collection within Spotify – by manually searching and saving each album to her account – is not worth the effort, so she engages in a very limited capacity with the platform.

Both cases tellingly point to questions of ownership, illuminating how playlists and tracks saved to personal Spotify accounts intermingle with other media and modes of music consumption. Strikingly, both MF and RS do not use Spotify to discover new musics, but for listening to music they already know and that they mainly own in alternative formats. They diverge, however, in their approach to their cross-platform consumption practices. For RS, Spotify is effectively a 'workplace iTunes', an extension of her previously-established consumption practices into new environments; while MF's Spotify collection has been tightly calibrated to duplicate his earlier collections and, despite its streamed 'immateriality', is marked by personal, social and affective resonances that resemble the residual traces of meaning attributed to physical collections (Benjamin 1968). What is striking is how earlier paradigms of music ownership, including collections of physical recordings and digital libraries of MP3s, appear to mediate users' understandings of their Spotify music collections: informants repeatedly compared their Spotify experience with other forms of music consumption, often noting their stronger affective attachments to musical objects believed to be fully owned (see Keightley 1996; Straw 1997).

The extent to which users understand their Spotify accounts as a personally-owned collection is illuminated by the much-reported

distressing experience of 'loss' when their collections are modified beyond their control by Spotify governance. NT, a vinyl music collector who briefly tried Spotify, chose to discontinue his use of the service upon recognising that songs are often unexpectedly removed from the platform. Such removal occurs because of the multiple multinational legal environments in which Spotify operates, resulting in convoluted licensing schemes, as well challenges to Spotify's regime by rights holders.[20] As a result, popular releases are commonly unavailable in particular regions, with no easily-accessible method for users to monitor their availability. More generally, the Spotify catalogue exists in a state of constant flux, with music frequently being rereleased, removed or otherwise disappearing from users' libraries. Given the intimate affective connections that consumers have with their music collections in both physical and digital formats (Burkart 2008; Hennion 2001; Kibby 2009; Marshall 2014; Shuker 2004; Sterne 2009), it is unsurprising that informants are often upset when speaking about the involuntary loss of music that has been removed from the platform. The ability of Spotify and its partner rights holders to withdraw music from circulation is indicative of the imperious, sometimes coercive governmentality of streaming services when compared to previous forms of music distribution and ownership, which lack such mechanisms for revoking ownership or 'repossessing' transacted musical objects once they are owned. It points to the radical shift in the nature of ownership inaugurated by rentier musical capitalism through services like Spotify: in Spotify, we might say, the alienable nature of music as a commodity is greatly intensified.

The unsteady nature of musical ownership on Spotify has theoretical implications: for whether collectively or individually held, musical and other objects in online circulation are conventionally understood to be *possessable* – if not necessarily in the terms of classical liberal conceptions of property. Indeed, the three informants portrayed previously exemplify a spectrum of positions on the nature of ownership and possession with regard to Spotify personal collections. In the case of MF, his curation of hundreds of playlists serves as an investment of affectively-imbued labour in the platform, and the resulting library is experienced as a highly personal, individualised collection. Here, music streamed by Spotify comes to be fully 'possessed' through the work of curation. In contrast, NT understands Spotify and other streaming services as transient and immaterial, inherently at odds with his ethos of collection. For NT, genuine possession depends on the musical object's material permanence: physical record collections – under the collector's control, resistant to being 'repossessed', and offering the pleasures of tactile stimulation and

the companionship of enduring copresence – offer musical-and-affective experiences vastly superior to those of Spotify. Whereas for RS, her Spotify library is understood as a cross-platform secondary embodiment of an existing music collection, affording access to a personal archive in alternative spaces and times. For her, the songs saved to a Spotify account do not constitute a form of ownership, but the songs themselves *are* thought to be owned inasmuch as they are (fully) possessed in physical and digital formats elsewhere. In each case, then, both affective attachment to and a sense of possession of a Spotify collection are profoundly mediated by a heightened and relational experience of music's material forms (Keightley 1996; Kibby 2000; Straw 2009).

A final thread in the analysis of Spotify 'exchange' relations pertains to the algorithmic implementation of a one-way data flow: the instrumentalisation and individuation of consumption achieved through the systematic and involuntary extraction and use of data derived from users' listening practices. This form of consumer surveillance amounts to Spotify's main implementation of Music Information Retrieval (MIR) methodologies, a burgeoning area of applied scientific research that encompasses the automation and systematisation of listening data to feed into music recommendation algorithms.[21] It is a governmental technique akin to what Mark Andrejevic has called 'the work of being watched' (Andrejevic 2002). Andrejevic examines the labour dynamics of digital market research, where value is captured from monitoring consumer behaviour, and where user accounts function as virtual commodities in the ongoing monetised exchange of marketing data.[22] The exchange relations designed by Spotify exploit the same techniques, such that continuous monitoring of users' listening practices – their affective musical experience – drives the platform's governance of consumption. To illustrate: the 'Activity Feed' function displays in real time the songs and playlists being listened to by a user's network of followed friends; while the 'Top Tracks in Your Network' feature generates an automatically-updated playlist constructed of the most popular tracks within, again, a user's network of followed friends. These examples of users' enforced participation in the 'socialised' recommendation of music, and thus music's intensified circulation and value generation, point to modes of exchange central to Spotify that are grounded in the instrumentalisation both of consumption and of the platform's socialities. Spotify's commercial operations therefore depend on extracting exchange value from the recursive analysis of listening habits and demographic profiles in two ways: most obviously, by targeting advertisements; but also by accelerating music's circulation among users' now-instrumentalised

online social networks, networks that are the result of users' own investment of (free, affective) labour.

Circulatory maintenance: a comparative analysis

One of the clearest ways in which users of platforms like Spotify and Jekyll are configured as participants is through the time and labour they are enjoined to commit to the functioning of both platforms. Drawing on Nancy Baym's (2015) account of the relational labour of musicians and their audiences, we conceptualise these diverse forms of upkeep and management as *circulatory maintenance*: necessary labour aimed at supporting the platforms' musical, technical and social functioning, without which the circulation of music would cease to occur. In Jekyll, while uploading music was the most obvious mode of participatory labour, the platform depended also on a host of other competencies and contributions among its users to maintain its various features. Similarly, Spotify expends effort not only on attracting new users and expanding the licensed catalogue, but encourages users themselves to engage in maintaining the platform and its sociotechnical relations. In both platforms, participation responds not only to creative energies, but to the need for digital forms of upkeep: correcting errors, preserving torrents, reporting bugs, preventing abuses and rule violations, and so on. In what follows, we probe the distinctive types of free labour devoted to maintaining both platforms as sociotechnical-musical assemblages.

Spotify, crowdsourced technical support and the instrumentalisation of 'community'

In Spotify it is the enlisting of audience labour to fulfil customer service requests that most clearly illustrates the demands of circulatory maintenance and the hybridity of labour practices: that is, the formalisation of informal work. Thus, the initial point of contact for users in need of technical help or other customer services is the 'Spotify Community' discussion forum. In marketing in general, and particularly in the service industries, the concept of 'relationship marketing' (RM) has been coined to indicate an increasing focus not on attracting new customers or selling products, but on the perpetuation of existing client relationships (McCourt and Burkart 2007). Spotify's 'freemium' model amplifies the corporate need to cement long-term client relationships, since retaining users and converting them from advertisement-supported

to paid subscription packages are key measures of Spotify's economic strength (Page 2013). In this light, it is particularly surprising that Spotify users are enrolled to answer the questions and concerns of other users: a crowdsourced approach to circulatory maintenance in which participants are expected, in effect, to repair others' relations to the Spotify brand by resolving any technical and operational problems that arise. Drawing on the lineage of online forums as well as expectations of communality and peer-to-peer support (Ridings and Gefen 2004), Spotify instrumentalises the 'community' forum model through its implementation of the RM platform Lithium, vesting first-line technical support not in paid employees but in unpaid Spotify users.

While staff members oversee the Spotify Community forum, the majority of technical support requests are handled by so-called 'Rock Stars': a staff-selected category that denotes highly active and competent users. The Spotify 'Rock Star Program' exists to incentivise and reward these active forum members; in return for their devoted technical service, it offers them a series of in-platform material and symbolic privileges and rewards – such as a free month of Spotify's Premium service. Rock Stars are trained to provide accurate support in handling common customer service issues, guided by Spotify tutorials and employees, and while Spotify attempts to make the process rewarding for them, they have no formal employment status. Unlike in Jekyll, where exchange and labour practices themselves engender ongoing musico-social relations, in Spotify the propensity for online discussion forums to stimulate participatory socialities is leveraged towards devolving circulatory maintenance to the platform's customer base. By replacing paid support staff with flexible, uncompensated users, Spotify informalises the work of customer service through crowdsourcing. As a result, Spotify Community forum practices have a hybrid status somewhere between official employment and regulated participation.

Seeding and the moral economy of Jekyll

If customer servicing points to Spotify's appropriation of participatory labour, in Jekyll the most common type of circulatory maintenance was 'seeding': the onerous work of uploading content through a BitTorrent client. But the labour did not end with the initial upload, for due to the design of private trackers, once a release had been uploaded to Jekyll, at least one member of the swarm had to actively maintain support for the torrent on their server to prevent it being purged from the index. Indeed, in its introduction to new users, Jekyll was described as a 'community'

that promotes 'sharing' through seeding. Since the labour of seeding involved users' own computers, making music available required constant human attention. Many users explained that because of the demands placed by seeding on their hard drive or bandwidth, their involvement in Jekyll necessitated frequent interventions in the form of deleting unnecessary files, transferring content to external drives or judging which torrents required long-term seeding – where 'long-term' could mean continuous uploading for three months or longer.[23] The motivation for long-term seeding, however, was not merely technical: it was also encouraged as a social good, mutually benefitting the seeder and Jekyll at large. The social good was perceived to stem from superior download speeds – a notable benefit of strong BitTorrent swarms – as well as from preventing the deletion of tracks, so maintaining a rich archive and supporting the continued availability of a range of musics. The participatory labour of long-term seeding therefore embodied Jekyll's archivist moral sensibility. And indeed, Jekyll presented itself in the private tracker world as a 'well-seeded' tracker, positioning itself against public trackers which often suffered from having few participants willing to seed long-term.

A corollary of these processes is that, as mentioned before, torrents that were not seeded by any swarm member for two weeks were automatically purged from Jekyll. A rough estimate places the total number of torrents removed due to inactivity at over half a million. This loss of often obscure and otherwise difficult to obtain musics from the platform deeply disturbed informant KF. In an interview he reflected ruefully:

> The only torrents that are absolutely safe from being pruned for inactivity are the ones that are extremely popular and well-distributed in the [physical] world as well …. [But in] terms of wildlife preservation, those are the albums that belong in the 'least concern' category.

KF responded to the tendency to evaluate torrents on the basis of their popularity by highlighting the archival importance of maintaining obscure works. Among KF and other users, the inactivity purges on Jekyll induced a melancholic sense of cultural erosion, and he noted the 'data and culture transfer' that Jekyll might ideally have enabled but which could no longer take place. As we have seen, Jekyll was well suited to such archivist sensibilities, and the requests service rewarded the circulation and preservation of obscure releases. The necessity continually to seed,

and preferably long-term, was therefore elevated by Jekyll to something resembling a moral principle: it was at once designed technically into the BitTorrent protocol, enforced by Jekyll's ratio system and expected of Jekyll participants as an inherent good – one that supported a rich musical ecology, including rare musics. Continual seeding, embodied in combined technical, musical and social labour, amounted to the crux of Jekyll's moral economy given the responsibilities to the common musical good it was thought to serve. In this way it highlights the moral dimensions of digital music exchange (Cheal 1988; Giesler 2006; cf. Scott 1976).

In their distinctive design of circulatory maintenance, Spotify and Jekyll manifest their hybrid exchange relations at their clearest: Spotify imitating and instrumentalising the participatory socialities of crowdsourcing on P2P networks in order to enhance commercial profitability; while in Jekyll, the participatory labour of long-term seeding was seen as a necessity to rectify the market failures of its quasi-formalised economy, while also being valorised as a core expression of commitment to the common musical-and-social good.

On the mutual mediation of licensed and unlicensed spheres

Much of the existing literature on online music circulation portrays its licensed and unlicensed spheres as pure, bounded and opposed (Cammaerts 2011b; da Rimini 2013; Kernfeld 2011). On the basis of the ethnography of Jekyll and Spotify, we contest this analysis, arguing that licensed and unlicensed domains of online music circulation are better understood as hybrid and as having evolved in counterpoint. On the one hand, the informal sphere – in the guise of unlicensed, extralegal systems of music exchange – is largely dependent on the recorded music industries to supply the musical objects that enter into circulation, resulting in 'an ambiguous position that is both inside and outside market economies' (Sterne 2012, 224). On the other hand, the formal market constituted by commercial music platforms invariably seeks to appropriate the informal participatory practices of P2P cultures as it pursues enhanced modes of audience engagement that transcend earlier distribution channels. In these and other ways, we suggest, both extralegal sites like Jekyll and commercial platforms like Spotify are engaged in mutual mediation: in their technical architectures, forms of exchange, socialities and labour practices, each draws on and transforms characteristic aspects of the other. However, this mutual mediation is not limited to the present

platforms: it can be traced back genealogically to their precursors, demonstrating the interrelated historicity of legal and extralegal spheres of music exchange.

Perhaps the most striking evidence that Jekyll's architecture incorporated historical influences from the formal music economy lies in its orientation to exchange. As we showed earlier, Jekyll's ratio system – with its elaborate market-like equivalences and its systematisation of reciprocities – and the requests forum – both a marketplace with currency-like mechanisms and an aspirational forum for collective action to enhance the musical commons – offered compelling proof of the mutual mediation of the formal and the informal. Jekyll's ratio system was significantly influenced by a market logic characteristic of the commercial music industries. Specifically, the fact that the ratio system evolved in reaction to the perception of a 'free-rider' problem is evidence of an implicit acceptance on the part of Jekyll's governmental regime of the 'tragedy of the commons'. That is to say, an ersatz currency was introduced to remedy the pitfalls of previous modes of exchange. As multiple cross-cultural works of economic anthropology have demonstrated, however, the 'tragedy of the commons' is neither universal nor inevitable: not only is the 'commons' defined and enacted differently in diverse property rights regimes, but non-privatised and communal approaches to ownership can prove to be effective ways of managing resources (Feeny et al. 1990; Hann 1998; McCay and Acheson 1987). Indeed, the ratio system's calculus of contributions conflicted strongly with the reciprocal ethics and dynamics of classic gift exchange – described memorably by Sahlins as 'the toleration of material unbalance and the leeway of delay' (Sahlins 1972, 193). The 'ratio watch' period outlined earlier, for example, was a strikingly rationalised and inflexible interval of reckoning, and one that was incompatible with the temporalities of generalised reciprocity.

Acknowledging the historical dimension of the emergence of Jekyll's coercive reciprocity is another key move in discerning the influence of the formal market. It points to the need to trace the genealogies of file-sharing. As discussed in the introduction to this volume, the transformation of music and its technologies by digitisation is prone to reductive and ahistorical narratives. One way to counteract them is to employ what Foucault calls genealogical analysis, in effect multiplying the actants that are assembled in explaining the course of events (Foucault 1980). By adopting this orientation, we note first that BitTorrent's rise to ubiquity cannot be explained as a result of its technological superiority. Rather, it emerged as a temporally-situated response to the social,

economic and legal conditions then widely faced by file-sharers. It is symptomatic in this regard that informants explained that they did not share back their downloaded files on Napster-like P2P networks (and later on public BitTorrent trackers such as The Pirate Bay) because they believed they were less likely to be detected by regulatory agencies if they removed their files from P2P availability after completing a download. The 'free-rider' problem did not arise, then, as a result of antisocial acts or technical limitations on bandwidth, but due to the perceived need to avoid the risks of prosecution for copyright infringement. In this sense, it was the punitive actions of the Recording Industry Association of America (RIAA), the International Federation of the Phonographic Industry (IFPI) and other recording industry agencies that directly shaped the contours of Jekyll's ratio enforcement scheme.[24]

More generally, the very software architecture of the BitTorrent protocol that underlay Jekyll speaks to the path-dependent historical array of technical influences it had accrued from the formal digital economy. In particular, the architecture of distributed computing on which Jekyll was built was initially pioneered in the formal economy and predated the extralegal spheres that grew around BitTorrent and its immediate predecessors. Notably, the now-defunct Swarmcast protocol, which preceded BitTorrent, was released in 2001 for the licensed distribution of large files and marketed as a potential bandwidth-saving solution for digital media corporations. Swarmcast developed several of the core distributed computing techniques that would later be popularised by BitTorrent, including that of splitting files into hundreds of small pieces, as well as the terminology of 'swarms' that came to define the networked public taking part in P2P exchanges (Kumar and Ross 2006). In turn, the design of Swarmcast along with that of file-sharing services such as Gnutella and Napster was influenced by several contemporaneous commercial software packages, including the anti-censorship P2P platform Freenet, as well as the P2P webcast streaming service Allcast (Dougherty et al. 2001). More generally, decentralised data transmission is itself traceable to the founding ethos of the internet (Dougherty et al. 2001, 7).

These genealogies suggest that the migration of file-sharing music subcultures from radically public P2P networks – requiring only a personal computer, an internet connection and freely available software – to closely-governed, highly exacting private unlicensed online formations like Jekyll cannot be understood as a response wholly preconditioned by BitTorrent itself. This migration is not a necessary evolution in the teleological expansion of file-sharing technologies, but a response to a

profusion of contradictory, mutually cannibalising sociotechnical tendencies, ideologies and relations. The negative imprint of the music industries on Jekyll is visible not only in its response to the imperative to evade copyright infringement penalties, but in the platform's strange mutation of the key principle underpinning the industrialisation of music: that the very proliferation and dispersal of music carries costs and necessitates intensive governance. In effect, the spectres of music's industrialisation and its commodity forms – from paratexts to ideologies of personal ownership – pervade and mediate even informal and unlicensed spheres of digital music exchange. Ultimately, generative as the sociotechnical architecture of Jekyll may have been, it did not represent some kind of terminal fulfilment of extralegal forces, but embodied just one tributary in the unceasingly inventive, continually-furcating flows of digital music exchange.

Conversely, for Spotify, we want to ask: to what extent is this commercial platform configured by the spectral presence of unlicensed music exchange?[25] Certainly, the music industry has tended to respond to the incursions of unlicensed file-sharing services by attempting to absorb them. But our ethnography suggests that Spotify is mediated by unlicensed file-sharing practices in multiple ways, with widespread ramifications across its royalty-generating operations.

A first manifestation of the influence of informal P2P exchange systems, and particularly private BitTorrent trackers, was evident in Spotify's technical design in its initial period, 2007 to 2014, which instrumentalised the technical resources of consumers in an arrangement new to commercial music distribution. Specifically, the Spotify client was designed – like that of earlier BitTorrent systems such as Jekyll – as a centrally governed P2P network, in this way massively reducing the scale of server required in order to provide on-demand streaming to millions of subscribers (Kreitz and Niemela 2010).[26] Moreover, while Spotify is technically classified as a streaming service, the Spotify client utilises a percentage of each user's free disk space temporarily to store streamed files for future listening: a practice referred to as 'caching'. Due to this technical innovation of distributing the cache's contents to nearby peers on demand, an innovation directly derived from the unlicensed BitTorrent model, Spotify required much less central bandwidth than earlier centralised client-server architectures; indeed, the Spotify server was technically parasitic on the P2P network of its subscribers, as well as on individual users' own storage capacities. Not only the technical design but the terminology is derivative: the server-side software that confirms Spotify membership and monitors consumption is called a 'tracker'. While

Spotify's technical genealogy has been traced by Kreitz and Niemela (2010) back to public, decentralised P2P systems, our contention is that private trackers like Jekyll fit the genealogy even more closely, such that Jekyll and Spotify can be seen to draw on interrelated histories in the construction of strikingly similar circulation models.

Spotify's mediation by unlicensed P2P online exchange is evident, finally, in a displacement characteristic of the platform: appropriating participatory practices inhering in the informal sphere for the purpose of their commercial instrumentalisation. We have shown this displacement, first, in Spotify's appropriation of crowdsourcing strategies grounded in the distributed architecture of P2P file-sharing systems like Jekyll. Spotify's elicitation of users' labour for its forum-based customer services simulates the decentralised knowledge exchange of unlicensed P2P online communities. Spotify thereby appropriates the online culture of amateur enthusiast forums and their bottom-up approaches to problem solving; the displacement both instrumentalises participation and regulates particular styles of participation in the service of expanded profitability. We have also shown the displacement at work in Spotify's appropriation of the curatorial labour of public playlist creation. Where non-commercial curation of this kind involves the creative recombination of music by participants who are affectively invested in the organisation of music collections that are often both personal and communal, in Spotify data harvested from such decentralised curation is exploited simultaneously to augment the platform's content management, through improved 'music discovery' and search techniques. The techniques at issue here – MIR-based analyses of music's social circulation – serve to enhance Spotify's recommendation systems, attuning them to more-than-individual consumption patterns, channelling social dimensions of musical activity, both personal social networks and geographical regions, back into Spotify's address to individual consumers. In this logic the social is always subservient to individuation, to intensifying the machinery of individual music recommendation.

Conclusion

> The worker's activity, reduced to a mere abstraction of activity, is determined and regulated on all sides by the movement of the machinery and not the opposite. The science which compels the inanimate limbs of the machinery … to act purposefully, as an automaton, does not exist in the worker's consciousness, but rather

> acts upon him through the machine as an alien power, as the power of the machine itself. The appropriation of living labour by objectified labour [becomes] the character of the production process itself … In machinery, objectified labour confronts living labour within the labour process itself as the power which rules it; a power which, as the appropriation of living labour, is the form of capital.
>
> (Marx 1973 [1857–8], 692–3)

The ethnography of Jekyll and Spotify illuminates the two platforms as contrasting hybrid assemblages. Both platforms, we have shown, involve marked transformations of the file-sharing and distributed computing lineages in which they participate: in Jekyll, a radical enclosure, rationalisation and pseudo-marketisation of the erstwhile open, public architectures and musical 'commons' of earlier P2P file-sharing and BitTorrent systems; in Spotify, the nesting within an individuating rentier capitalist music service of circumscribed simulations of P2P exchange and 'social' music interfaces. Our depiction of the elaborate governance of participation in Jekyll contributes a much-needed realism to the literature on unlicensed online music circulation; by resisting the temptation to either eulogise or criticise the practices, ideologies and ethics of extralegal file-sharing, we offer an analysis of the associated socialities, labour and exchange relations that demonstrates how private trackers are neither fully communal nor completely absorbed by market logics. An unexpected fluidity between formal and informal online music economies characterises both platforms: in the case of Jekyll, hybrid reciprocities, quasi-commodity exchange and a regulative class system are hybridised to generate the distinctive social formations of the private music tracker. Spotify, in contrast, combines the appropriation-simulation of informal user-generated practices with rigid individuating governance in the service of a rentier economy. In each case our portrayal of the intimate interrelations between the materialities and socialities of exchange demonstrates their critical importance for analysing the 'politics of platforms' (Gillespie 2010) and the politics of music. These are politics that move across scales: the capacity of Spotify and Jekyll to shape music consumption derives both from their invention of novel forms of rentier musical capitalism and musical moral economy, and from their engendering of new types of musical subjectivity and online sociality.

Double ironies reverberate through our analyses, producing a bizarre symmetry. On the one hand, the irony of Spotify as an innovative mutation in online musical capitalism – yet one that learns from and

appropriates its libertarian extralegal double. On the other hand, the irony of Jekyll's particular contribution to the diversification of the extralegal domain: its invention of a pseudo-marketised governance of unlicensed music exchange via the technical implementation of discipline and censure, albeit leavened by aspirations to the common musical-and-social 'good'.

Throughout, we have emphasised how technical design in both platforms is simultaneously social and musical design. To paraphrase Callon: the *agencement* of ratio metrics and request bounties, of the playlist format and the algorithmic extraction of listening data, together constitute what music consumption is and what music consumers are, as the latter engage with these platforms. We have drawn attention in both platforms to the evolving, intricate and powerfully regulative governance of music's online consumption through the configuration of surprisingly pronounced social hierarchies and demanding or even involuntary participatory obligations. Our ethnography points to the force of sociotechnical design in configuring music consumption, with users either adapting to the regulative design or, if they find it uncongenial or intolerable, engaging minimally or dropping out. Something about the distributed and collectivised nature of Jekyll, its well-developed norms and the demands it made of participants, endowed this unlicensed platform with a momentum that fuelled its inflexibility. While the commercial Spotify, despite ersatz gestures at participation, offers a consumer proposition that users can either opt to take in varying degrees or not at all. Strikingly, despite our commitment to Akrich's compelling theory of the drift between designed use and actual use, neither platform offers much leeway for user *détournement*.

Contributing to the anthropology of exchange, we propose that the participatory socialities created by both platforms amount to compelling and rewarding elements of users' experience, and that these socialities should not be conceived merely as instrumental conduits for an overriding telos of musical possession. Rather, any explanation of the intensity of users' engagements must look beyond the 'music itself' to the particular qualities of online experience proffered by these platforms. Prime among these qualities, we suggest, are the stimulus and solace created by the diverse socialities engendered by online engagement, as well as – in Jekyll – the sense of higher musical-and-social purpose animated by the pursuit of music as a common ideal and an ideal commons. This is the case even, or perhaps particularly, when participatory online music platforms like Jekyll make such onerous and exacting demands that they may provoke obsessive investment from participants. Moreover, we join recent

anthropological work in stressing how, in both platforms, a variety of types of exchange coexist (Scaraboto 2015; Strathern 2011). For the participatory socialities configured by both platforms are plural: if Jekyll formally orchestrated unequal and competitive 'class' relations that might appear to vitiate the pleasures of virtual socialities, these unequal relations coexisted with alternative socialities that counteracted the 'class' system – through practices poised somewhere between generalised and balanced reciprocity that embodied the more equal and cooperative socialities of the commons, and through the lively competition for prestige and other symbolic rewards. In Jekyll, then, the 'contradictory cartographies of the social' (Latour 2005, 34) were experienced by participants as absorbing and as drawing them to online exchange. Despite the hierarchical core of Jekyll's sociotechnical design, the dual fascinations of internet-mediated and musically-mediated socialities endured.

In comparison, if Spotify uncontestably offers its consumers musical pleasures and affords access to unprecedented catalogues of recorded music, its highly individualised, rentier-based design occludes the modes of P2P exchange and attendant socialities that have come to characterise online music consumption. Consequently, although Spotify purports to offer a fully 'social' listening environment, the platform lacks meaningful characteristics of circulatory sociality: more-than-dyadic reciprocities and the distributed dynamics of the P2P 'commons' are both effectively absent from its functioning. At base, this is attributable to its rentier style of musical ownership. Spotify consumers' inability fully to possess musical objects, and thereby freely to exchange them, results in relatively weak socialities – except inasmuch as Spotify use is embedded in already existing social relations. In radical contrast to Jekyll, the socialities formed through music's curation and circulation (via playlists) on Spotify are limited to dyadic acts of exchange, forcefully circumscribed by the platform's centralised design.

In analysing Spotify, we have developed throughout this chapter the concept of rentier musical capitalism. We intend in part to contribute to the theorisation of capitalism as having multiple forms, acknowledging not only how it transforms music but how it is itself mediated by music. In invoking rentier capitalism we draw on general arguments that the 1990s to 2000s have seen 'increasing uncertainty and volatility in the macroeconomic environment [which,] when combined with higher returns in the financial sectors, may encourage rentier-type financial investments at the expense of real investment projects' (Demir 2007, 353). Earlier, we cited Pasquinelli's analysis of the 'cognitive rent'

extracted by Google through controls over 'knowledge enclosures', which he links to the pervasive global pressures to strengthen intellectual property regimes, inasmuch as copyright amounts to the extension of rent to culture with the intent 'to expropriate the cultural commons and reintroduce artificial scarcity' (Pasquinelli 2009, 8). We find these arguments persuasive and would draw connections to Andrejevic's account, mentioned before, of the intensification of the extraction of value through the automated mining of data on consumer behaviour. We argued that Spotify's rentier model depends on the ratcheting up of these processes in the expressive cultural arena through the recursive analysis of listening practices and consumer demographics, fuelled by the instrumentalisation of consumption and of users' online social networks – derived as they are from users' free, affective labour.

The quotation from Marx's *Grundrisse* at the start of this conclusion – which was formative of the autonomist Marxism of Terranova, Paolo Virno and others – is therefore prescient. Its significance becomes clearer when contrasted with alternative theorisations of labour and circulation. To date, studies of music's circulation have focused productively on the materialities and mobile forms produced by things in circulation (Straw 2010), as well as the recombinatory creative processes entailed by musical and artistic work (Novak 2013; Ochoa and Botero 2009). Given our analysis of the part played by labour and exchange in digital platforms like Jekyll and Spotify, however, we lean more towards Benjamin Lee and Edward LiPuma's (2002) account of the dynamic interrelations between exchange, labour and self-reflexivity in constituting 'cultures of circulation'. In making their case, Lee and LiPuma hold Marx's 'ethnography' of capitalism up against the operations of gift-based societies. Yet surprisingly, they take no account of the catalysing force of the internet in globalising and accelerating today's 'circulation-based capitalism' (Lee and LiPuma 2002, 210). Moreover, in charting how self-reflexivity fuels social imaginaries, they forego the theory of governmentality. For rather than conceive of such imaginaries as emerging unmediated, as Lee and LiPuma do, the perspective of governmentality alerts us to how they are formed through the interplay between technologies of government and technologies of the self as they are conditioned by capital's heterogeneous forms – including its online manifestations and its mediation by music. In this chapter, we therefore revise Lee and LiPuma by introducing these elements: for online music circulation exemplifies just the acceleration of 'circulation-based capitalism' of which they write, while also manifesting a host of governmental processes.

But it is the implications of the transformations of labour by Spotify

with which we want to end. Given that ethnographic analysis is emergent from the material that it confronts, we return at this point to Terranova's stark theorisation of free labour. She writes: 'free labor is structural to the late capitalist cultural economy', and the internet 'is a mutation that is totally immanent to late capitalism, not so much a break as an intensification' (Terranova 2002, 53–4). Informing her stance is the work of Virno, who summarises the present global condition as a 'crisis of the society of labour', in that '*all of* post-Fordist labor-power can be described using the categories with which Marx analyzed the "industrial reserve army", that is, unemployment'. Virno goes on to ask whether the 'distinction between "labor" and "non-labor" [and between] remunerated and non-remunerated life' is now arbitrary (Virno 2004, 102–3). What is compelling for us here is the attempt to think labour in its changing conditions and configurations as a totality, such that the vast commitments of labour and labour time committed to such internet-based formations as Spotify and Jekyll can be relativised against this panoramic background.

Having acknowledged these accounts, however, the ethnography of Spotify impels us finally to intensify them – by remediating Marx. For prime among the novel features that we have anatomised in Spotify are the rentier-musical-capitalist governance of consumption through the inter-corporate (Spotify-Facebook) instrumentalisation of users' free, cognitive-and-affective labour; the recursive intensification of consumption via its algorithmic mapping and modelling by the science of Music Information Retrieval – a science that links the neoliberal university to music technology corporations (Spotify); and the inventive ways in which musical knowledge, pleasure and passion are themselves ploughed back into the expanded production of value. Adapting Marx: in the MIR-based algorithmic data mining applications that drive Spotify, 'objectified' musical labour and subjectivities confront 'living' musical labour and subjectivities 'within the labour process itself as the power which rules it; a power which, as the appropriation of living labour, *is the form of capital'* (Marx 1973 [1857–8], 692–3, our emphasis). Music's online circulation and consumption represent, in this sense, a particularly rich experimental seam for the trial and invention of new capitalisms themselves.

Notes

1 We use the term 'extralegal' here to acknowledge the contested and unsettled status of circulation practices within global intellectual property regimes (Nordstrom 2007, 211). Recognising music exchange practices as extralegal, as opposed to illegal, allows for a

theoretical focus on the particularities of exchange practices that exist on spectrums of formality: from informal to formal, from illicitly circulated to quasi-legal distribution forms.

2 Due to the ethical responsibility to respect informants' confidentiality, 'Jekyll' is a pseudonym for this private tracker. Additionally, due to the legally sensitive nature of topics discussed during interviews, all informants, including Spotify users, are identified by pseudonymous coded initials. Fieldwork was conducted from July 2013 until Autumn 2014 both online and offline in New Orleans, LA, USA. Jekyll shut down on 17 November 2016, after several of its servers were seized by French law enforcement agencies. Therefore in this chapter we address Jekyll in the past tense.

3 The Jekyll index contained nearly a million unique releases, covering a diverse spectrum of popular and art musics. The collection was most comprehensive in the areas of the classical Western art music canon, contemporary electronica, indie pop/rock and particular subgenres of hip hop. Of its many exclusions, popular musics produced outside Europe, North America and Japan were noticeably lacking.

4 In media studies, the term 'user' typically refers to any individual who interacts with a product or service; a 'participant' makes active contributions in constructing the service; and a 'consumer' is conceived as having the least agency in the service's development (see Ridings and Gefen 2004). In this chapter we argue that Spotify and Jekyll users are inherently participants, in that the technical design of both platforms obliges members to contribute in particular ways.

5 'Curation' in digital music platforms refers to practices focused on the selection, organisation and presentation of musical tracks. This may include drawing attention to particular artists, albums or compositions in personal profiles, or assembling individual songs into shareable playlists.

6 On the path-dependency of technological development see David (1985); Callon (1990); Barry (2001, 210–14). See also Snape and Born, chapter 6, this volume, on the genealogy of the music programming language, Max.

7 On file-sharing as a form of resistance, see Cammaerts (2011a, 2011b); Caraway (2011); Jones (2002); Sinnreich (2013). On participant perspectives and ethics, see Andersson (2012a); Burkart (2014); Giesler and Pohlmann (2003); Kibby (2000); Lysloff (2003); O'Reilly and Doherty (2006).

8 Against the view that online social formations constitute virtual 'communities', widespread in media studies, we echo recent work in calling for more rigorous and well-defined conceptions of digital publics (see Amit 2002; Born 2013; Kendall 2011; Postill 2008). When we use the term 'community' in this chapter, it is therefore always as an 'emic' concept.

9 On governmentality, see Foucault (1991); Burchell et al. (1991); Rose (1996); Walters (2012). The literature on governmentality extends Foucault's idea of a microphysics of power that is capillary, dispersed and irreducible to juridical forms of power. Governmentality is concerned with analysing the arts, practices and techniques of government, including the 'space of the "conduct of conducts", where technologies of government and technologies of the self intersect' (Walters 2012, 15). Our conviction is that the online platforms we anatomise in this chapter represent a new plateau in the *combined* development of new forms of power in relation to music along with new types of 'freedom' in music consumption.

10 Woodburn (1998) develops a similar, equally suggestive analysis of sharing systems among hunter-gatherers, although he insists that they are not exchange systems but modes of redistribution. He argues that such 'immediate-return systems are best seen as a political phenomenon' that limits 'profoundly the possible development of inequalities of power, wealth and status', while permitting 'a much greater degree of freedom from dependence and subordination than is possible almost anywhere else' (Woodburn 1998, 61).

11 'Torrent' refers to a simple pointer file, unique to each music release, which identifies the technical details of content and its location from available nodes (other users) in the network.

12 While 'darknet' is frequently used to indicate extralegal spaces for file-sharing, we deploy the term to 'differentiate private, anonymous distributed networks from their public predecessors' (Wood 2010, 17).

13 This legal action included copyright infringement lawsuits against users of P2P networks such as Napster, Kazaa and The Pirate Bay: see Baldwin (2014) and Carrier (2010) on representative cases.

14 The protocol was created in 2001 by the American programmer Bram Cohen (Ares and Aibar 2011).

15 In Spotify's method of royalty calculation, the exact figure payable per 'listen' is not fixed but determined by artists' relative 'market share' – artists' total streams to all Spotify activity. Spotify's artists' relations webpage claims that 70 per cent of all revenue is distributed to rights holders each month.
16 On the concept of musical capitalism, see Born (2013, 50–51, especially note 81).
17 For an early analysis of technically-prescribed exchange ratios in file-sharing, see Slater (1998, 2).
18 The majority of music available on Jekyll was uploaded by users who had purchased the release, either as a digital download or as a physical copy.
19 This description of Spotify is set in an ethnographic present related to fieldwork in *c.* 2015. It is now even more apparent that the inducements to contribute curatorial knowledge to Spotify musical publics belong to a particular phase of Spotify's strategic expansion, as Spotify user interface design in 2022 much more strongly emphasises corporate-curated and algorithmically generated playlist functions: see Drott (2018b).
20 An infamous example is when the British artist Thom Yorke removed the discography of his solo career as well as the band Atoms for Peace from Spotify in July 2013, arguing that Spotify's business model favours major record labels and is detrimental to unestablished and independent artists (Arthur 2013).
21 MIR research, originally based in academic music and computer science departments, has grown rapidly through alliances between the neoliberal university and commercial and industry interests.
22 Indeed, Andrejevic's prescient view that Napster would have economic value for the music industries because, as a crowdsourced platform, it offered a ready means for monitoring music consumption strikingly prefigures the later contours of Spotify's design (Andrejevic 2002, 243).
23 The temporal economy of seeding varied: an initial upload – the time it took to distribute a single track to another peer – depended on the size of the release and participants' available bandwidth, ranging from several seconds to a few hours. Maintaining the availability of a track on a torrent was, however, far more time-consuming because at least one seeder had to continue seeding it throughout the torrent's life on the platform. The situation resulted in some seeders feeling obliged to maintain a torrent by seeding it even when they no longer themselves wanted access to it.
24 As a corollary, the extent to which users were willing to seed on Jekyll so as to fulfil its ratio requirements was largely dependent on their belief that copyright enforcement representatives had not yet penetrated such private trackers. As one informant explained, if he believed Jekyll to be compromised in this way, he would simply migrate to another tracker, abandoning his Jekyll account along with his significant economic and affective investments in it.
25 Andrew Leyshon (2003) has noted the profound impact of digital exchange technologies on the music industries, documenting the disruption of their established business practices. He argues that Napster's transformation into a licensed subscription service represented an appropriation 'of the distributive capacity of Napster to ends that will nevertheless protect the income of copyright capitalism' (Leyshon 2003, 549). Likewise, Patrick Burkart and Tom McCourt contend that 'what [the Big Four major music labels] cannot control [they] must co-opt' (Burkart and McCourt 2006, 44).
26 Spotify began discontinuing its P2P technical infrastructure in 2014; this move, which rendered the architecture obsolete, serves to underline Spotify's strategic instrumentalisation of P2P orientations at the time of fieldwork, paralleled by its lack of affective investments in the ethos of P2P exchange.

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6

Max, music software and the mutual mediation of aesthetics and digital technologies

Joe Snape and Georgina Born

Introduction

In recent years, Max – a graphical programming environment for media art practices – has come to prominence as a staple of contemporary music-making worldwide.[1] Used by innumerable musicians and artists, Max software is taught to students as a core curriculum component in music, music technology and multimedia art degrees offered by thousands of institutions of higher education across the developed world. In their MusDig research, Georgina Born and Patrick Valiquet found Max to be ubiquitous in university digital music trainings in Britain and Montreal. But Max is also increasingly prominent outside academia, as evidenced by the three-day Max convention held at the Massachusetts Museum of Contemporary Art in April 2019 and by a recent slew of how-to books for uninitiated coders in English, Spanish and German (Lechner 2014; Manzo and Kuhn 2015; Manzo 2016; Perales 2017; Taylor 2018). Despite Max's established position as a global vernacular, there is scant research that investigates what the program is, the environments it inhabits, and how it is contributing to refashioning the nature of musicianship and the kinds of musical cultures evolving with music's digitisation. Through multisite ethnography, this chapter provides a portrait of Max to inaugurate debate on these matters.

The prevailing conceptualisation of Max is formulated in terms of what it can do for those who use it. Unsurprisingly, Max's developer, a company called Cycling '74, presents the software as powerful, reporting that 'for over two decades, people have been using Max to make their computers do things that reflect their individual ideas and dreams'.[2] Less expected is the discourse of many Max practitioners. Online searches and conversations with users reveal scores of platitudes attesting to the program's astonishing powers. Characteristic paeans include: 'It's so versatile and open-ended it can be used for practically anything'; 'It's pretty much capable of anything'; 'Max can do anything you want it to'.[3] The discourse that surrounds Max, then, constructs the software as aesthetically neutral, transparent and infinitely reconfigurable – a mirror reflecting back pure authorial intention. In short, as *not* a mediator. This type of discourse on music software has been prevalent in academic and nonacademic computer music and audio technology circles for decades.[4] It envisages for Max a universal, purely technical functionality that denies its embeddedness in social and cultural formations, as well as its technical specificities and their musical consequences. Probing Max's complex materiality and the actual uses made of Max, this chapter sets out with different assumptions: that Max and similar computer music environments are powerful mediators. They are not neutral channels supporting human musical imagination and labour; rather, they have particular proclivities that inflect, extend and transform musical imagination and labour.

The chapter is based primarily on fieldwork conducted by Joe Snape in spring 2014 at the University of California Berkeley's (UCB) Center for New Music and Audio Technologies (CNMAT).[5] Probing Max's sociomateriality via scenes deeply involved in Max design and use, it complements Valiquet's and Born's ethnographies (chapters 7 and 8). CNMAT has a long tradition of teaching Max to students at UCB, notably at its renowned annual Max Summer Courses in Berkeley, which ran under Adrian Freed's stewardship until 2016, and of expanding Max's functionality through software and hardware design. Beyond UCB, the San Francisco Bay Area is home to Max's developer, the company Cycling '74. Many of Cycling '74's full-time employees live in the Bay Area and engineers working for the company hold positions at regional educational organisations. Together, Mills College and San Francisco Art Institute play important roles in fostering communities of Max users, as does Stanford University's Center for Computer Research in Music and Acoustics (CCRMA) in Palo Alto. Individuals from these institutions and beyond participate in a vibrant experimental music scene that sees daytime developers perform as musicians by night, and in which everyday overlaps

between programming cultures and musical cultures facilitate probing discussions about their interrelations.

Complementing the Berkeley fieldwork, and providing comparative perspective, was fieldwork at a second site: the 2013 Tokyo Experimental Festival (TEF) held at Tokyo Wonder Site, a contemporary arts organisation. Running for two months annually, the festival invites musicians and sound artists to undertake residencies and performances, and more than two-thirds of these used Max. In addition, as a musician, Snape has worked for almost a decade with Max alongside other users, inside and outside educational settings. His longstanding, lived engagement adds nuance to the ethnography that follows.

Music, materialities, aesthetics and STS

If Max is not a neutral channel but a core manifestation today both of how digital technologies condition musical expression and of how musical cultures inflect the uses made of such technologies, then a better conceptual grounding for this research is to ask: what light does Max throw on the mutual mediation of technology and aesthetics? In this way our study partakes in a larger shift at the borders of music technology and media studies away from transhistorical and metaontological concerns[6] towards historicised, sociocultural and materialist analyses of music media. A host of questions ensue: most obviously, how should we understand the materiality of as complex a 'technical object' as Max? And how can we analyse, and where locate, agency in relation to Max as a sociotechnical assemblage? But also, what kinds of musical techniques and expressions does Max tend to favour? How do they get insinuated into ongoing musical genres? And where exactly does the aesthetic 'lie' in relation to the specific materialities of given music technologies? Examining such questions throws light on Max and music-making. But in taking this perspective to music, music also becomes a means of enriching existing debates in science and technology studies (STS).

One of the contributions this study can make to STS is by taking seriously something that has surprisingly been overlooked: how the specific domain in which a technological assemblage is participating makes a difference[7] – in this case, music as an expressive, aesthetic and social art. While Max may be marketed as aesthetically neutral, in our work on Max we note that even the most novice musician encounters it with what might be called situated musical knowledge – as the embodied bearer of a particular musical history and culture.[8] Moreover, s/he

mobilises Max in particular musical projects, just as groups of musicians engage with Max in ongoing collective musical projects – projects that may stretch out over time and space, enrolling others and coalescing as genres. The musical bodies and aesthetic imaginations that engage with Max, then, are not tabulae rasae, but bear the affective and cognitive marks of culture, history and social relations. Yet the aesthetic situatedness of the uses made of technologies like Max has largely been absent from the theoretical armoury of STS in relation to music technologies.

And indeed, the Max practitioners with whom we were in dialogue in MusDig exhibited pronounced and distinctive genre-specific reflexivities about the aesthetic potentials of digital and analogue technologies.[9] We argue later that this intensity and diversity of reflexivity troubles any account of music's technological mediation that posits subject-object relations in music as symmetrical. It follows from the existence of these ubiquitous reflexivities that the challenge of analysing a human-music-technological assemblage like Max poses the need for a double historicity: it requires that we engage not only in tracing the technological genealogies immanent in the assemblage, but also the specific aesthetic genealogies being drawn on in contemporary practices. A further challenge follows. For if our topic is the mutual mediation of aesthetics and technology, then how should we understand this mutuality? Two classic dualisms predicated on powerful taken-for-granted boundaries have to be interrogated here: not only the boundary between what is often called musical expression and technological means – that is, aesthetics and technology; but the boundary between humans and nonhumans, between fleshy bodies and the metal, wire and code automata in which they are so often enmeshed. In both cases the question is: where does the boundary lie, and why and how is it coproduced in this way? Indeed, the task posed to STS by studies of music technologies like Max is to withstand not two but three compelling determinisms – not only technological determinism and an uninterrogated humanism, but aesthetic determinism – in charting the varied ways in which a material set-up, certain sounds and certain encultured configurations of the human get entangled.

In addressing the nature of Max and its relationship with music-making, we draw two areas of literature into dialogue. The first, as mentioned, is STS. It will become clear that Max invites us to revisit and revise common themes in STS: the nature of agency and how it is distributed between the human and nonhuman; and the extent to which users are materially configured and constrained by design, and whether they can exercise considerable individual and collective latitude in their

engagements with even the most formatted software packages. If, having raised these propitious questions, we cannot answer them fully, we nonetheless begin to elucidate them through the ethnography of Max. We probe Max's aesthetic propensities, charting how the program engenders certain unexpected techniques and cultures of use, as well as proffering a particular kind of musical time – with aesthetic consequences.

A second growing literature to which this chapter relates is critical organology, a burgeoning concern across the music disciplines with the materiality of musical instruments. The focus, in Maria Sonevytsky's words, is on how through their 'morphological, metaphorical, and historical' associations, musical instruments become actors 'in the making of musical meaning' (Sonevytsky 2008, 101). In her groundbreaking essay on the Indian *sarangi* (Qureshi 2000), a bowed string instrument, Regula Qureshi traces the *sarangi*'s social lives and cultural entanglements among a series of constituencies in North India, Pakistan and North America. Qureshi develops an array of perspectives encompassing the material culture and symbolic meanings, sensory engagements and affective memories that coalesce around the *sarangi*, paying close attention to the changing social relations in which the *sarangi* is embedded. Charging Qureshi with insufficient attention to the way that instruments can initiate social processes, Eliot Bates takes organology closer to actor-network theory. He contends that 'there is a difference between musical instruments being incidental to, or constitutive of, social interactions' (Bates 2012, 372), and illustrates this through a series of takes on the 'social life' of the Turkish *saz*. Bates argues for the agency of musical instruments as active participants in relationships 'between humans and objects, between humans and humans, and between objects and other objects' (Bates 2012, 364) – indeed, he suggests, they might be considered 'subjects' in their own right (2012, 368).

The MusDig research, however, cannot follow critical organology as it has been constituted. For where this field has taken as given musical instruments' existence as relatively bounded and singular physical objects, no such assumption can be made for 'instruments' in the electronic and digital domains. Indeed, the complexity of music's technological mediation demands that we amend this early assumption of the 'material turn' (Bennett and Joyce 2010) and its cousin, 'thing theory' (Brown 2001; Daston 2004; Henare, Holbraad and Wastell 2007), in their encounter with ethno/musicology. For the musical worlds that we studied in MusDig present far more plural and distributed materialities than those posed by individual musical instruments, as well as notation or the score. We cannot equate materiality in digital music assemblages,

then, solely with physical objects, but have to consider the materialities of code, of electromagnetic waves, indeed of sound itself – entities that stretch or defy orthodox definitions of an 'object'. But digital music's materialities are additionally complex in being inherently multiple, built of many communicating and articulated layers of hardware and software, in the sense not only that hardware always comes to us encrusted with software but that software is itself immanently multiple, composed of many layers of code, and in the way that digital and analogue devices and processes are invariably combined and mutually compounding (Born 1995, 1997; Meintjes 2003; Valiquet 2014; Théberge 2015; Bates 2021).[10] The digital-and-analogue assemblages that we address therefore present a formidable challenge to material analysis.[11] In what follows we address Max's materiality initially through an analysis of the entanglement of human and nonhuman processes and agencies in an entity central to the program's architecture and use: a Max patch.

But of additional note is how these plural materialities offer so many surfaces and processes with which practitioners' aesthetic imaginations and experimentation can engage. In again mentioning the aesthetic, we highlight a common lacuna of STS and organology; for what is striking about both fields, including research on music technologies, is how little consideration has been given conceptually to questions of the aesthetic.[12] A major exception is the work of Jonathan Sterne, who has addressed the issue through the listener's sensate experience of auditory media (Sterne 2003) and through the audio qualities of particular music-technological formats (Sterne 2012). Sterne's contributions are groundbreaking, but when we pursue aesthetics in the broad vicinity of the current study, an array of additional productive perspectives heave into view. Sean Williams (Williams 2012, 2013), in his comparative research on the use of the step filter in the music of Stockhausen and King Tubby, shows how this primitive hardware device was central to producing their radically different yet broadly coeval electronic aesthetics in the 1960s and 70s. In turn, George Lewis (Lewis 2000), reflecting on his design of the interactive software-composition *Voyager*, points to how musician-programmers can consciously write aesthetic propensities into generative music software, endowing software with 'its own sound'. Søren Pold, for his part, has addressed what he calls interface aesthetics, the materiality of which 'is gradually rendered manifest, visible, readable, audible, navigable'. For Pold, 'the interface is the basic aesthetic form of digital art' (Pold 2005, 1).

A further significant perspective comes from Anne Danielsen's work on the reflexive medial aesthetics of 'opaque mediation' (Danielsen and

Maasø 2009, 140). Danielsen is referring to the metamedial aesthetic play evident in contemporary recorded musics when familiar historical sonic techniques – 'the hum of analogue stereos, the edit points of samples in a loop, the quantisation noise in lossy data compression' (Danielsen and Maasø 2009, 139) – are invoked ironically or nostalgically as affect-laden comments on particular sound media. In this way, she argues, 'specific aural qualities associated with digital sound … may be used to achieve different aesthetic effects as well as to shed light on mediation and medium specificity as such' (2009, 127). Bringing these distinctive accounts together compels us to ask: given analogue-and-digital music's plural materialities, where is the aesthetic located – in the medium, format, hardware, software, interface, or reflexive medial gesture? Or in the combination of some or all of these? And if so, how can we analyse their combination – their coproductive aesthetic powers?

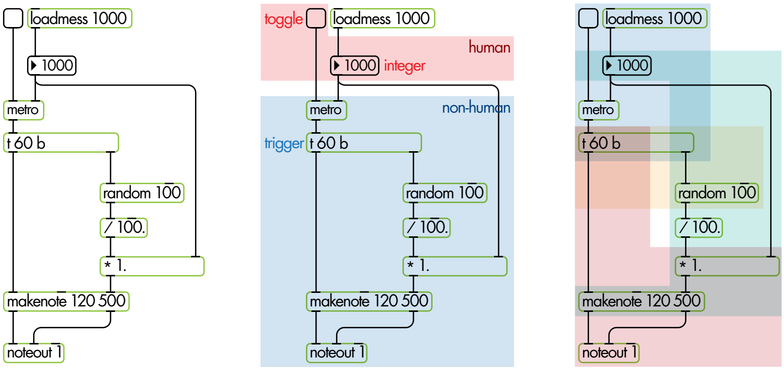
The analysis of materiality, while of crucial importance, illuminates only partially the mediations that bear on Max's aesthetic proclivities. Later in the chapter we address certain of Max's social mediations, specifically the institutional ecology supporting the program's design and production. For Max is subject to a striking metapositioning, in the terms of Bourdieu's field theory (Bourdieu 1993; Hilgers and Mangez 2014). This is a metapositioning that spans the scenes we studied, that is not only social but material, discursive and aesthetic, that evidences the relational identities of Max and the other technologies at issue, and that is evolving. In part this metapositioning takes a classic high-low form. At the 'high' end there are software environments, like Max and SuperCollider, that inhabit the global academic institutions and networks of music production and that are considered to be the engines of complex and demanding musical and programming work. Counterposed against them, at the 'low' end, are the programs known as digital audio workstations (DAWs), like Ableton Live, Logic, Pro Tools or Cubase, that are widely associated with the rhythm-, metre- and pitch-based aesthetics, performance styles and production schedules of popular and 'commercial' musics. Beyond this opposition, there is a vast in-between space of heterogeneous practices engaged reflexively in hybridising, parodying, hacking and demurring from these polar states. As we will see, for much of Max's life the program has been defined by proponents in opposition to the DAWs. Yet as we report, Max's positioning has been rapidly transforming through changes that simultaneously reshape its institutional foundations and aesthetic potentials. In Max the social-institutional and the musical-aesthetic, we show, are intimately interconnected.

The chapter proceeds archaeologically, beginning 'inside' Max, then

moving out and scaling up. The first section excavates the minute operations of code inside a Max patch, addressing the theorisation of agency in the sociomaterial processes through which the Max assemblage produces sound. We proceed to give an account of prevalent cultures of Max *use*, focusing particularly on a culture involving music-making practices with clear aesthetic consequences that are at odds with the formal teaching of Max. Max's aesthetic propensities are then pursued through a higher-level, central feature of the program's architecture: how it constructs intramusical time. The software's treatment of time is traced through three widely used, characteristic musical techniques presently associated with Max: live processing, material generation and physical computing; and the discussion culminates in an analysis of a performance by the computer musician Holly Herndon that exemplifies these techniques, while also indicating the need for an expanded account of the aesthetic adequate to Max's uses in live performance. Finally, the chapter examines Max's social mediation in the guise of its institutional ecology (what Born identifies as the fourth plane of social mediation)[13] as it relates to the program's evolving technical configuration and aesthetic potentials. We trace Cycling '74's changing relations with commerce, via the Ableton Live corporation, and with the public university, via UCB's CNMAT. A non-reductive account of the mutual mediation of technology and aesthetics in Max, we suggest, requires attending to each of these scales of its operations, as well as forms of social mediation, as they implicate all the others.

Max's materiality and aesthetic agency: the unsingular anatomy of a patch

To elucidate Max's materiality as it produces sounds, and where agency lies in this process, we anatomise one of Max's most ubiquitous components: a patch. A Max patch consists of interconnected programming functions called 'objects', the basic units of code, arranged in a specific way to produce a particular result. Patches are composed in and accessed via the Max graphical user interface (GUI), a skeuomorphic digital emulation of the analogue patches of earlier electronic music synthesis. Much Max use consists in the making, copying and arranging of patches. We take as our exemplar a patch made by the British musician and multimedia artist Mark Fell, an interlocutor in Born's fieldwork, who in 2013 wrote an article for the music magazine, *The Wire*. The essay included an image of a Max patch Fell used to realise a track on his 2010



Figures 6.1a, 6.1b, 6.1c Three visualisations of Mark Fell's Max patch produced for his album, *Multistability* (2010).

Credit: Mark Fell and Joe Snape.

album, *Multistability*. The patch is technically simple – made up of ubiquitous functions – while sheltering a series of complex relationships between functions and user that are common to many patches. We therefore present the analysis of this patch as unsingular: it offers an introductory yet generalisable account of Max's architecture. In what follows we uncover the functions present before tracing the relations that are emergent between them, relations that are known intuitively to but rarely reflected on by practitioners. The analysis exposes the dynamic and relational properties of patches, opening up consideration of where agency lies in their operations.

Patches involve drawing lines called patchcords to connect the outputs of certain objects to the inputs of others. In this way intertwined paths of data flow are composed. Upon arriving at an object's input, data either induces a certain functional behaviour in the object, or is modulated by one or more further variables before continuing along the path. Arranging a few such simple paths, Fell's patch produces a repeated pitch of constantly and randomly changing duration. This aesthetic effect is central to Fell's music, and the patch must therefore be conceived of both as an embodiment of often tacit knowledge and as a conscious means to achieve certain aesthetic ends.

Figure 6.1a shows Fell's patch as an arrangement of ten objects. Two types of object can be discerned: objects that participate in the network of their own accord, and objects that open up the arrangement to human interaction – by requiring human intervention in the form of entering

numerical values. These types can be regarded, respectively, as indexical of nonhuman and human actants (Latour 2004, 75). Figure 6.1b shows an annotated version of the same patch in which objects are named and colour-coded: human actants appear against a pink background, nonhuman against blue. In this way we can begin to make sense of the patch as subgroups of key components: working from top to bottom, a pair of human input objects appear to precede a larger group of nonhuman objects.

But the relationships emergent in this set-up are less categorically defined than Figure 6.1b suggests. Figure 6.1c indicates why: it divides the patch into four overlapping subsystems distinguished again by colour, each of which can usefully be identified, borrowing a word from actor-network theory, as an 'alliance' (Latour 1988). These are groupings between objects of different type and function that collectively perform a key task. Let us now trace the signal flow through these alliances.

The first, hybrid alliance (blue) is one that obtains between the objects **toggle**, **loadmess**, **integer**, **metro** and **trigger**.[14] Human actions mediated by **toggle** (a tick box that turns the process on and off) and **integer** (a number that determines the time in milliseconds between events) define whether and at what rate **metro** impels **trigger** to send cues, downwards through the chain.

The second alliance (orange) is fully nonhuman: it obtains between **trigger** and **random** and executes the chance-based selection of a number between 0 and 99 – a range set by the value '100' defined within the random object box. When cued, **random** selects and passes this number onwards. The rate at which numbers are chosen and sent forth is dependent on the rate of event cues that **random** receives from **trigger**. This, as we have seen, is in turn defined by the agency emergent in the first alliance.

The third, hybrid alliance (green) exists between the human-input object **integer**, **random**, the arithmetical / (division) and * (multiplication) objects, and **makenote**, and defines a note duration based on the number generated by the first alliance. **makenote** is an object that compiles incoming data into messages intelligible to objects that perform operations with MIDI.[15] In order to do this, **makenote** must receive at least two pieces of information: note pitch and note duration. Because Fell's pitch is arbitrarily fixed at MIDI value 60, only duration concerns us here. A note's duration is determined by the number of milliseconds between two commands – a pairing of note-on and note-off – that together constitute a MIDI event. To prevent serial notes from overlapping, their durations must not exceed the time interval between

event cues received from the first and second alliances. Hence the need for the following arithmetical trick: the number between 0 and 99 produced by **random** and received by / is divided by a factor of 100, producing a number between 0.0 and 0.99. * then multiplies the output of **integer** – that is, the time in milliseconds between event cues – by this decimal value, thereby always rendering a note duration of 99 per cent or less of the figure describing the time interval between events.

The fourth alliance (pink) is again exclusively nonhuman: it exists between **trigger**, *, **makenote**, and **noteout**, and it collectively produces the patch's final output. Informed of pitch and duration by **trigger** and * respectively, **makenote** communicates strings of numbers to **noteout**, an object that allows the patch to send MIDI information beyond Max – by default, to the computer's MIDI engine. This invites a subtle observation: that there is a *fifth* alliance, only partially represented in the patch and extending beyond it. It obtains in the relationships between **noteout**, the MIDI engine, Fell's listening, Fell's musical ideas and proclivities, **toggle** and **integer**. Attending to the sonic output of the patch, Fell is able – but not bound – to respond and adapt his input to the system accordingly. If he chooses to respond, output is linked to input mediated by his musical sensibility. If Fell chooses not to respond, the processes will recur, indefinitely producing new random durations until toggled off. In either case, in terms of the fifth alliance, whether acting or not acting, Fell is exercising his encultured, en-genred aesthetic imagination.

What does this sociotechnical exegesis imply for theories of mediation and questions of the nature and location of agency? First, it pays to spell out the minimal influence Fell has on the patch. With **toggle**, he decides when the program ought to be active and inactive; with **integer**, he determines the upper bound for the time between musical events. After these decisions are made, much is left still to happen before an output is produced. This is where Max enters the fray, performing a broad range of processes. Indeed, of the five alliances detailed, two (the second and fourth) are exclusively nonhuman, and these fulfil important and complex tasks: selecting a value at random and transforming that value to produce the appropriate arithmetic conditions for the successful production of a musical event. These actions are not only generative but exhibit a primitive self-organising quality,[16] or at least a kind of reflexivity with respect to both internally and externally produced variables – a capacity to produce a wide range of meaningful outputs based on a single general specification. There is, then, a clear case to be made for Max's creative agency at this point. Compared with Fell, from this perspective, the patch may seem to be vastly more ingenious, industrious and

productive in its contributions to their ‘coproductive’ entanglement.

But to attribute such agential dominance to Max over Fell in this way is to lose sight of the bigger picture. For one, the patch’s operations are bounded by Fell’s decisions, and its industry might be seen as a mere filling-in of his metalevel integer values. In this light we might agree with Simon Waters’ vivid formulation that ‘the constraints and constructs upon which music depends are not only, not even mostly, to be found in the physical object of the instrument, but in the physiology of [the playing] body, in the algorithms which operate in this particular piece of warm, wet meat’ (Waters 2007, 20). Moreover, there is a higher-order musical awareness rendered in the fifth alliance that is emergent neither purely from the human nor the nonhuman. The patch generates randomly, Fell listens, Fell adjusts, the patch continues to generate freely within new bounds, and through these near-simultaneous and parallel actions, Fell and Max collaborate. Andrew Pickering recognises a similar ‘dance of agency’, a ‘dialectic of resistance and accommodation’ between humans and materials in scientific experiments (Pickering 1995, 22). With regard to scientific apparatuses, Pickering casts machines in an inert role: a mere capturer of already-out-there human agency. Yet attributing such passivity to Max fails to grasp the intensely generative quality of its internal processes. Moreover, Pickering portrays a linear, to-and-fro motion between human and machine. What the *Multistability* patch evidences is, however, parallel processes occurring simultaneously and recursively – note generation and the setting of bounds, respectively – each inter-affecting the other. There are other complexities present that further nuance our interpretation. Although some alliances do not directly involve Fell, our analysis shows that each alliance is not a self-contained unit but overlaps in nonlinear ways with others. In the second alliance, for instance, **random** depends on the rate at which commands arrive from **trigger**, which in turn depends on the integer value received from the first alliance. Likewise, the fourth alliance is powerless to produce without commands from the first, second and third. Thus each alliance, although performing a local operation, is at root reliant both on those that precede it and – by virtue of the patch’s feedback mechanisms – on those that follow it. Given these nonlinear dynamics, Fell’s apparently minimal human input in fact bleeds influentially into every corner of the system.

Having made the effort to peel apart the system into its component actants, it becomes clear, as we have shown, that the way to understand the relations between Max user and patch is not to separate out and hold apart human and nonhuman, but to develop a precise and subtle analysis

of their intimate interrelations. Here our account becomes unsingular in another sense: not only are the relations in this patch redolent of those latent in many patches, but it has as its focus components – a human and a nonhuman composed of a host of mediating processes – neither of which have useful agency as singular entities. Our anatomy must, then, examine interrelations across the entire ecology of the patch.

Bruno Latour elects to view the coproductive relations between human and machine flatly, rejecting common-sense distinctions between human and nonhuman entities and seeing only actants – human, nonhuman, skilled or unskilled – that exchange and multiply their properties through relations (Latour 2005). Although this approaches what is happening between Fell and Max, Latour's insistence on an agential symmetry between the actants fails to note the particular qualities of the processes involved, as well as Fell's reflexivity towards the assemblage, inflected by his previous music-technical experiences and aesthetic allegiances. If Latour understands relations semiotically, Karen Barad (Barad 2007) moves beyond Latour, away from thinking of humans and nonhumans as pre-given entities and towards understanding both as contingent differentiations – interpretive 'cuts' – made in an integral world. For Barad, writing in the wake of Gilbert Simondon (1958) and Brian Massumi (2002), this means appreciating such entities as shifting isolations within a constantly changing continuum of relations without antecedent relata; and she develops the neologism 'intra-action' to capture how such contingently isolated entities emerge from the continuum. Barad portrays her position, based on 'a genealogical analysis of the material-discursive emergence' (Barad 2007, 150) of apparently isolated human and nonhuman entities, as provisional – against the grain of unreflexive ontologies that cut without questioning. There are resonances here with the relations deciphered in the *Multistability* patch: the idea of Fell and Max acting not *on* each other but *within* each other evokes the interpenetrative qualities of sound and music and the sense of an emergent, self-organising system. Yet while Barad throws light on the production of boundaries that result in Fell's and the Max objects' apparent separation and autonomy, she cannot offer an understanding of their particular relations.

Two writers demur from the symmetry advocated by Barad and Latour, while acknowledging that agency should be attributed to a complex of human and nonhuman actors. Both are illuminating. In his account of material agency, Lambros Malafouris espouses asymmetry, re-theorising human intentionality while querying any assumption that

human agency pre-exists engagement with particular materials. Rather, ‘the world of things elicits and actualises intentionality according to the “situational affordances” (Gibson 1979; Knappett 2004, 2005) of a given context of engagement’ (Malafouris 2008, 33). A stronger rebalancing towards the human is evident in Lucy Suchman’s work. Against the symmetry espoused by Barad and Latour she poses the concept of mutuality, cautioning that ‘mutualities … are not necessarily symmetries’ (Suchman 2007, 269). She notes, moreover, that ‘analyses … that describe the active role of artifacts in the configuration of networks inevitably seem to imply other actors standing just offstage for whom technologies act as delegates, translators, mediators’ (2007, 270). Suchman insistently foregrounds ‘the particular accountabilities’ (2007, 270) of human actors, as well as the privileged capacity of certain actors – engineers, programmers, and indeed users – to set complex sociomaterial processes in motion. For our purposes, that Fell’s actions are both so minimal and yet so minutely and exquisitely attuned to the qualities of sounds issuing from the Max assemblage in which he is himself enmeshed points both to the privilege his actions enjoy and to the prominence of his aesthetic sensibility in guiding them. Where Latour and Barad refuse to privilege human agency, our ethnography supports the conceptual insights of Malafouris and Suchman – while, for music technologies, we add to Suchman’s human ‘accountabilities’ the irreducible power of aesthetic reflexivities.

De-scription to détournement: Max – mathematical formalism to hack and flow

From the minute operations of a Max patch, we now scale up to examine the practices and cultures of use associated with the software. The origins of Max’s user-orientation have to be understood historically. Miller Puckette, Max’s founding developer, recalls his motivations when working on the first versions of the software in the late 1980s in the Parisian computer music research institute, IRCAM: ‘A Music Workstation should be a good platform for *rapid* experimentation with new ideas. In the ideal, musicians with only a user’s knowledge of computers [should be able to] invent and experiment with their own techniques for synthesis and control’ (Puckette 1991, 59). Puckette achieved the rapidity he sought by coding a collection of general-purpose atomic processes that could quickly and easily be combined to create patches of greater complexity. A major sea-change between Max and its program ancestors, Music-N[17] and

C, was the computational power of the hardware at Puckette's disposal. Running as an interpreted language on a Faster Than Sound (FTS) processor, Max drew on libraries of instructions already compiled into machine code.[18] In this way, unlike Music-N and C, Max circumvented the need to compile and recompile code outside of real time, offering unprecedented control over audio processes on the fly. This was radically innovative: where computer music composition revolved in the 1970s and 80s around the laborious preparation of coded representations of abstract temporal structures for subsequent compilation and execution, Max initiated a different paradigm.

Max's design responded to problems endemic in computer music illuminated by Born's (1995) ethnography of IRCAM's research culture in the mid-1980s, the period leading into Puckette's creation of Max. For his core aim – designing a platform that would allow real-time, empirical experimentation with musical ideas – met an urgent need among musicians. As Born states, IRCAM's technology projects in this period 'aimed in various ways to overcome the limitations of earlier high-tech computer music, and to recapture some of the characteristics of good musical instruments that had been lost in the transition from analogue technology: real-time response, less conceptual abstraction and complexity, and empirical control – … a more appropriate interface for musicians'. Indeed, IRCAM's two main research projects at the time, the 4X and CHANT/FORMES, 'aimed respectively to advance powerful real-time digital synthesis at the level of hardware and to provide increasingly sophisticated high-level music software for synthesis and control' (Born 1995, 183). The CHANT and FORMES programs were 'intended to be more intuitively appealing and musically meaningful, less complex and scientistic than the prior generation of patch languages' (1995, 188). Moreover, they were informed – as Max would soon be – by the AI-related development of 'object-oriented programming', itself derived from research at MIT and Xerox PARC in the 1960s and 70s linked to the emerging paradigm of personal computing. Yet despite their aims, the 4X and the CHANT/FORMES software projects had serious limitations: the latter remained non-real-time programs, while the 4X machine was institution-bound, inaccessible to the vast majority of musicians. Born details the intense frustrations experienced by composers using IRCAM technologies in the mid-1980s, and how they called for more intuitive, real-time musical environments (Born 1995, chapters 8 and 9).[19] It is this context that stimulated Puckette's work on Max. Max's origins lay, then, in responses to the severe limitations of music software and hardware, particularly the lack of tools offering real-time and musically responsive controls.

Ironically, however, the way that Max is formally taught today belies these goals. Max classes tend to adopt a rigorously scientific and formalistic approach in which the assumption is that student-users must learn to program patches from scratch. This means studying what each component element of a complex patch represents and the scientific basis for their functioning, as well as how to control the intricate relations between them. Some institutions design Max classes as part of a broader curriculum involving instruction in mathematics, signal processing and computational design, as at the Institute of Sonology – a leading institution in The Hague. The overall pedagogical effect is that Max programming is experienced as highly abstract, mathematical and cerebral. Patrick Valiquet writes of his observations at a Max class in Montreal: 'There were conventions to deal with instruction order, variable naming, and the way code was laid out on the page. [The tutor] encouraged students to make Max patches "modular", for example, by building what were called "abstractions" and "subpatches" [since] a patch could be made to work more efficiently, they were told, by "abstracting" part of its function. This meant embedding complex fragments of code in separate windows and hiding them from view … The key stylistic imperative, then, was that a patch should involve multiple parallel and asynchronous processes operating on many metaphorical surfaces at once … If the effect of Max's design was to appear intuitive and visual, the contradictory goal of programming [pedagogy was] to seek depth, abstraction and complexity' (Valiquet 2014, 183–4). The irony, then, is that despite the original aims for Max, normative uses of the program as manifest internationally in its formal pedagogy tend still to be experienced by many users as forbidding of intuitive, real-time musical work.[20]

It is against this background that Snape's ethnographic observations of a widespread culture of use among Max practitioners today can be understood: a surprising, radically different mode of engagement characteristic of informal Max-based practices. The focus in these informal practices is on the use of Max help files, tutorial files and example patches written by Cycling '74 or third-party developers, which either ship with the software or are available online to download.[21] Unlike conventional software documentation, because of their intended purposes of demonstrating and teaching, these files contain fully functional assemblages of code; and like all functional code, they are open to manipulation by users if desired. Figure 6.2 illustrates the principle.[22]

This widespread culture of Max use can be illustrated by the practice of Al, a musician using Max and a staff programmer at CNMAT. Al's music

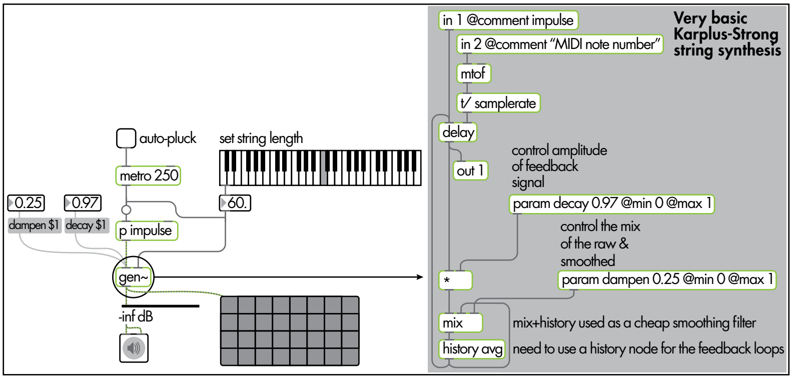


Figure 6.2 Two views of Max code inside the **gen~ karplus-strong** example abstraction copied by Al into his patch.

Credit: Joe Snape.

consists in the design of feedback networks, quasi-stable sonic states in which he intervenes in real time with a MIDI controller. While Al's musical practice is impressive in its sophistication and entirely his own, his coding strategies are typical of a broader Max user-base, indicating how Max is reconfigured or *détourned* in its everyday usage. The following passage describes a ten-minute window from a fieldwork meeting between Al and Snape, at Al's home in Oakland on a Sunday afternoon:

> Finishing a joint, Al connects up the **gen~ karplus-strong**[23] object, locks the patch again, and clicks the **toggle** object labeled 'repeat' in the upper-right corner of the patch. Crossing his hands, he sits back and listens to the effect; via a 'hidden' unit of programming, a rhythmic element has been introduced, the tone now modulated as if it were a bouncing ball repeatedly dropped and allowed to come to rest of its own accord.
>
> A short time passes before Al returns to the trackpad. He tries another few values for the **phasor~** objects, first 5hz, then 510hz, before drawing patchcords to two inputs on the **gen~ karplus-strong** object: inputs that drive the decay and damp times for the physical model of a string. A sudden change: we hear a constantly shifting texture, unpredictably sustained, the interaction with the bouncing modulation no longer distinct from the changes in its duration and sustain. Al immediately draws another patchcord between the leftmost *** 15.** object and the **float**[24] object feeding the

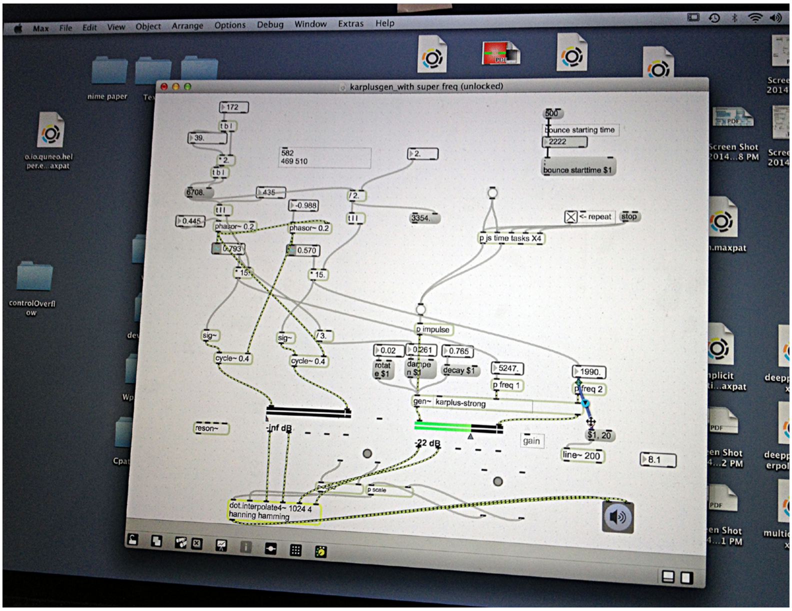


Figure 6.3 Al's **karplusgen_with superfreq** Max patch, running on a MacBook Pro under OS X (2014). Fieldwork image.

Credit: Joe Snape.

p freq 1 abstraction. The pitch centre of the sound begins to rise, peaking loudly in the midrange. Al reacts instantly, adjusting the volume on his studio monitors to a lower level. He repeats the process between the rightmost *** 15.** object and the **float** feeding **p freq 2**. This time the change is less perceptible, and Al increases the rate of the **phasor~** objects. He pauses.

Looking at Al's screen over his shoulder [Figure 6.3] makes two things apparent: the way in which he explores the duplication of code as a means by which to produce musical complexity quickly,[25] and the relative visual disorder of his patch, as evident in the many overlapping patchcords.

Next, Al creates a new object: **dot.interpolate4~**.[26] He immediately calls up the object's help file using the keyboard shortcut 'apple-shift-h' and unlocks the file, proceeding to copy a block of objects from it – including two **pictsliders**[27] – and pasting them into his own patch. He connects the first two outputs of the leftmost **live.gain~**[28] to the third and fourth inputs of the **dot.interpolate4~** object, then patches the first two outlets of the rightmost **live.gain~**

> into the fifth and sixth inputs of the **dot.interpolate4~**, adjusting the two **pictslider** values. The sound snaps into focus; throbbing with a clear pulse, each burst of sound differs in pitch but is timbrally consistent. Al turns away from the laptop and speaks for the first time in ten minutes: 'That sounds pretty cool.'

From this ethnographic interlude, it is clear that Al works in a highly affective manner in which, under the influence of a psychoactive drug, the pursuit of compelling sounds guides an open-ended, unpremeditated compositional process in which music-making and code-writing are fused. Rather than pause to make his code legible, Al proceeds improvisationally through short bursts of coding, then listening and rapid aesthetic judgments, as both are afforded by immediate sonic feedback. Al's use of abstracted (or encapsulated) code is a case in point: commonly used in Max to 'hide' chunks of code in order to preserve the conceptual order of patches, it makes it possible to retain a visual overview of programming as it becomes too unwieldy to manage in a single window. But, as Al's practice evinces, such abstractions (or encapsulations) also allow specific arrangements of objects to be copied and pasted easily from one patch to another. Heidegger's term 'ready-to-hand' captures how Al's relation to abstractions as he deploys them should not be understood as an intellectual one, in which abstractions stand apart as an autonomous process (an 'object' that is 'present-at-hand' in Heidegger's terms), but as an absorbed practical engagement with abstractions as tools-in-use, such that it is Al's fluent, improvisational practice with the technique that uncovers and explores its entwined 'programmability' and 'musicality' (Heidegger 1962 [1927], 98-9, 101).

Absorption is very apparent in Al's practice. Surprisingly, given his professional programming credentials, the first time Al and Snape met they spent an afternoon poring over patches Al had written, not speaking eloquently about the sounds they produced but simply trying to figure out what they did. Post hoc, Al seemed as baffled by his patching as Snape was. The situation stems, he explained candidly, from his doing-by-feeling method: 'I've never been much of an engineer … I don't really read the help file; I just plug things into each other and see where it goes … There's a kind of state you get into after a few hours of patching where there's a different way of understanding what the patch is doing. It's a more intuitive way.' To achieve this state, Al noted, requires extended and seamless periods of time in which to code. It is a state akin to that identified by Gabriella Coleman in her ethnography of hackers: their yearning for an 'obsessive and blissful state' of continuity, the product of

'unimpeded immersion' in programming, to which she applies Csikszentmihalyi's term 'flow' (Coleman 2013, 11; Csikszentmihalyi 1990).

That Al's practice is widely shared is shown by Fred, a UC Berkeley Computer Science undergraduate who tells a similar story about his Max programming, particularly his use of help files.

> 'To be honest, I don't ever use the Max [written] documentation.'
>
> 'Why?'
>
> 'Because if the help file doesn't have what I want, I usually Google it. Help file is always the first, Google is second.'
>
> 'Why?'
>
> 'It's not as *fast*. Here in the documentation I have all these functions, which is cool, but there's no way for me to guess which of these functions is going to do the thing I want. So maybe "duration" is what I want? But then I have to read all this shitty documentation! [Instead], the help files are kind of snippet repositories.'

Al and Fred turn to the help files for ready-assembled groups of objects so as to accelerate patching and make it as musically seamless an experience as possible. For such users, while the help files remain a valuable source of information, they lend themselves more to the wholesale appropriation of chunks of code than to learning abstract knowledge which has then to be materialised in code written from scratch – a process with little appeal. Other Max users take the same path: online user Dave says of collaging existing patches, 'I don't start any of my Max projects from scratch. I use the tutorial files as sort of a platform to jump off of.' Interlocutors in London, The Hague and Tokyo adopt a similar practice, often with a wry smile or wince at the thought of writing from scratch. Rather than hide these borrowings, users acknowledge them freely. The overwhelming sense in this culture of use is that copy-pasting code from help files is received practice – even their very point.

Of course, this collagist coding is not the point of Max help files as envisaged in Cycling '74 official releases. Indeed developers at Cycling '74, while aware of the practice, expressed surprise at its ubiquity – for help files are conceived as documentation to assist in the design of curricula in formal educational settings, a resource intended to differentiate Max from its open source competitors, Pure Data (PD) and SuperCollider. The use of help files to provide libraries of ready-made sounds thus represents a significant repurposing of documentation designed for other ends. This break between design and culture of use

exemplifies Madeleine Akrich's (1992) conceptual couplet of *in-scription* and *de-scription*: how the design of a technical object inscribes into it certain projected uses – uses, however, that are invariably transformed, or *détourned*, by users' heterogeneous engagements with the object. The case of Max extends Akrich's argument, however, in showing that at issue are not the idiosyncrasies of individual users, but virally communicated, collectively coordinated phases of practice – distinctive, evolving cultures of more and less formal or informal, more and less institutionalised, use.

But there are further implications of the culture of Max use identified. For the copy-and-paste codes are not simply ingenious means of accelerating tedious processes: many of them also generate characteristic sounds, with clear aesthetic consequences. In a creative ecology that thrives on copying, reuse and the delegation of expressive agency to predefined constellations of code, what then happens to musical sound? It is clear that Max users adopt these practices as a way to negotiate a complex music programming environment considered too laborious and time-consuming to traverse otherwise. The result is that objects and sounds reappear through the repeated reuse of existing patches and code, collaged into often familiar hybrids. As a Cycling '74 developer reflected in one of our interviews:

> If you look at people's patches for long enough you recognise chunks of them that are copy-pasted from other patches. And it's interesting to think about the values that you, as a developer, pick at random to fill out those patches that become the default values for someone else as they make an artistic choice. And then you have this art that has this *stamp*.

The notion of the *stamp* is telling here: confronted by an age-old but vastly amplified challenge – the tabula rasa not of the empty stave but of the Max window – and driven by the desire to code quickly and in large chunks, the circulation of ready-made objects and concatenations of objects accelerates the process of designing a sounding system. In this way, mimetic coding practices inevitably elide technique and aesthetic. Max therefore offers not so much a boundless space for aesthetic individuation as it offers, for many users, a pool of pre-existing aesthetic gestures – specific sounds, timbres and sonic processes.

What do these findings imply for theorising the relation between technology and aesthetics? In Al's musical Max practice we observe two distinct movements. On the one hand, for example in his use of the **gen~ karplus-strong** object, strongly recognisable sounds derived from

well-known Max patches colour the music he makes – to the extent that any reasonably experienced Max user will hear that particular patch in action.[29] Max unmistakably produces certain sounds or timbres. On the other hand, Max, its patches and sounds come to be subsumed by each particular user's ongoing musical persona – to be enfolded within soundworlds, evolving genres, that are irreducible to Max. In Al's case, Max participates broadly in a genre of electronic free improvisation. The mediation of technology and aesthetics is therefore decidedly two-way: Max and Al coproduce a resultant soundworld, but one in which Al's identification with a particular musical imaginary enfolds his use of Max.

But there is another dimension to this culture of use, one illuminated by comparison with hacking practices. Nicolas Collins has described his early hacking experiences as ecstatic and revelatory, deriving an explosion of musical possibilities from apparently impoverished technical resources – old engineering magazines, appropriated circuit schema and homemade electronic circuits cobbled together from reclaimed components (Collins 2006, xiii). What we observe with Max is the inverse: for Max users like Al and Fred, many of them expert programmers, when faced with Max's infinitely reconfigurable sonic-technical universe, take refuge in the involution of this universe via its reduction to help files. They seek out and fold into their practice a series of ready-made objects, existing inscriptions of the technical-aesthetic space, to achieve greater stricture and constraint. In one light, at stake are strategies intended to defend against the threat of 'creative paralysis' given the sprawling potentials of Max (see Magnusson 2010, 62). In a less extreme view, the desire is to create conditions conducive to the experience of musical immediacy. The informal culture of Max use described, taking refuge in shortcuts and presets, thereby approximates an intensified, accelerated, digital mutation of a hacking practice previously grounded in the tactile materiality of analogue electronics, a reduction of the digital boundlessness of Max to analogue-like interactions and empirical manageability.

Max makes time makes techniques makes aesthetics

The intimate mutuality between technics and aesthetics is particularly pronounced in the way that Max deals with time, and the responses from users this elicits. In this study we encountered the work of more than seventy artists making music in numerous genres, including composers of contemporary western art music, sound artists, and others working in

electroacoustic music, improvisation and audiovisual work. Yet despite this generic diversity, practitioners were often heard describing each other's music as 'sounding like Max'. British musician Leafcutter John spoke during fieldwork of stinging post-concert feedback by an influential figure on the scene: 'Robert Henke came up to me after a set I'd played and said *that music sounds like it was made with Max*. And I suppose on some level he was right; perhaps there is a certain sound that Max has.'[30] Views like Henke's are not rare in electronic music discourse, also beyond Europe and the US. Japanese musicologist Yuji Numano, a jury member on the TEF selection panel, wrote a pithy criticism about the works submitted for consideration:

> What stood out on the whole was how each work brings together the intermediary senses of sight, sound, touch, and others besides. [But] 'the modes of connecting' [are particularly] important. On this point, it is my personal feeling that many of the works were rendered mediocre by their use of MAX/MSP.
>
> (Numano 2013, 4)

For Numano and Henke, Max is a powerful creative tool, but it can also render musical practices mediocre and predictable. These critical views point to a pervasive sense of 'Maxness' on the international scene, one that is rarely articulated openly or discussed in concrete terms. In this section we trace this sense to widely recurring musical tropes engendered by the particular type of musical time favoured by Max, and we take this as a means to prise open the entanglement between time as figured in Max and aesthetic forms that have become widespread in electronic music.

Discussions about prevailing ways of using Max were common in the scenes we observed, and illuminate these matters. In an interview with Tim, a staff developer at Cycling '74, we asked a simple question: 'What is it easy to do in Max?' He took a moment to think. 'Nothing is that easy', he began, and went on:

> It's easy to … I want to say it's easy to play a sample, but it's *not* easy to play a sample. It's easy to … *I can only say what it's hard to do*. It's hard to lay out a track, as in a DAW. It's incredibly hard in Max to have two samples or two events in any kind of synchronous relationship. It's very hard to play one loop and then put a beat on top of it that is in step. Or to take a sample and time-stretch it the way you can in Ableton Live so that it matches with the piece of music …

Evident in Tim's hesitant account of what Max can do is how, even for Cycling '74 staff, the easiest way of conceiving of the identity and powers of the program is relationally – specifically, through its difference from and negation of what is possible in Ableton Live and other DAWs. As we claimed at the outset, Max is thus implicitly and explicitly defined in opposition to the DAWs. And at the heart of Tim's hesitancy is his attempt to pin down the particular way Max deals with time, in its difference from the temporal paradigm of DAWs. Where DAWs represent time visually as a left-to-right scrolling space that can be viewed panoramically, zoomed in on, and worked on to achieve complex, visible and replicable temporal structures (Théberge 2013), Max does not do this by default. While it is not impossible to create with Max the ubiquitous processes familiar from analogue and digital recording, like rewind, fast-forward or a moving playhead, they are challenging and laborious to program in Max as they require elaborate synchronisations between myriad independent processes, for which the coding is complicated. In other words, for Max to handle time like a DAW, it is necessary to build a DAW within Max. Palpable here is how both Max and the DAWs are, particularly in their handling of time, at once technical-and-aesthetic assemblages.

A vastly simpler option is to work with the kind of time that Max is more readily configured to offer, a temporality in which musical events simply do or don't happen, without a coded sense of a musical past that can be recalled or a musical future that can be fast-forwarded to. Given Max's immanent temporal paradigm, instead of creating complex patches capable of simulating elaborate musico-temporal abstractions, most Max musicians create unsynchronised processes with inputs and outputs that are either active or inactive. Working in this way forecloses aesthetic modes that demand DAW-like canvases on which can be inscribed complex, layered temporal structures; instead Max privileges musics invested in liveness and in sounding in the present. Indeed, arguably, Max's temporal affordances have catalysed the resurgent interest among musicians in the past decade in the aesthetics of live improvisation. Responses to Max's temporal predilections can be classified further, however, into three pervasive techniques: live processing, material generation and physical computing. Figure 6.4 (p. 245) arranges the practices of a sample of musicians drawn from fieldwork on one or more of three intersecting lines, each corresponding to one of the three techniques, which are explained in the analysis that follows.

Among these artists, the work of Kouhei Harada, Dudu Tsuda, Simon Scott and Holly Herndon exemplifies *live processing*, where Max

is used to design and execute audio effects in real time on a given input.[31] During his performance at TEF, Japanese free improviser Kouhei Harada used a patch to capture and play back guitar sound in very short bursts through a process called granular synthesis. A few days earlier at the same venue, French songwriter Dudu Tsuda treated his live piano playing in the same way, using Max to loop short sections of material.[32] In an analogous spirit, British artist Simon Scott designs complex delay lines in Max through which he plays electric guitar to create dense, shifting textures, and American Holly Herndon treats her voice similarly.[33] In each case, Max works as a kind of sophisticated effects pedal whose circuitry can be conceived and assembled by the user and its parameters varied in real time. This use of Max entails a performance practice involving a set of easily recognisable materials – vocal or instrumental inputs like microphones or pickups, digital displays for monitoring effects, and frequent use of human interface controllers like computer track pads or MIDI faders – resulting in particular sonic characteristics – often blurry, granular clouds of sound – that shift more-or-less predictably in response to the vocal/instrumental input.

If live processing thematises the act of processing in live performance situations, the second technique, *material generation*, is geared towards *non*-real-time production – often based in real-time exploratory processing in the studio. In this sense, British duo Autechre, German composer Oval, Japanese producer Satoshi Hattori, and the music of UC Berkeley composers John MacCallum and Ed Campion all offer fine examples.[34] In each case, variable chance-based operations are implemented in Max to produce raw materials for further composition at a later stage. Like Oval's, Autechre's probabilistically-produced sounds are recorded to disk in the studio for subsequent editing in a DAW, as with the source material of Hattori's music. Similarly, Campion generates temporal structures in Max in the studio, as does MacCallum, which are saved as text files to be realised subsequently as conventional notation in a software auxiliary to the programming environment.[35] While the aesthetic imprint of Max on music composed in this way is mediated by additional software in arranging the materials – evidence of an increasingly hybrid practice with respect to software – a particular formal trope, in which blocks of more-or-less static sonic materials are alternated between or crossfaded in sequence, is pronounced among musicians using Max in this way. Tanaz Modabber and Pierre Mourles' performance at TEF was exemplary: blocks of material generated and compiled in the studio were played back sequentially from Ableton Live, with transitions smoothed by overlapping instrumental passages performed live.[36]

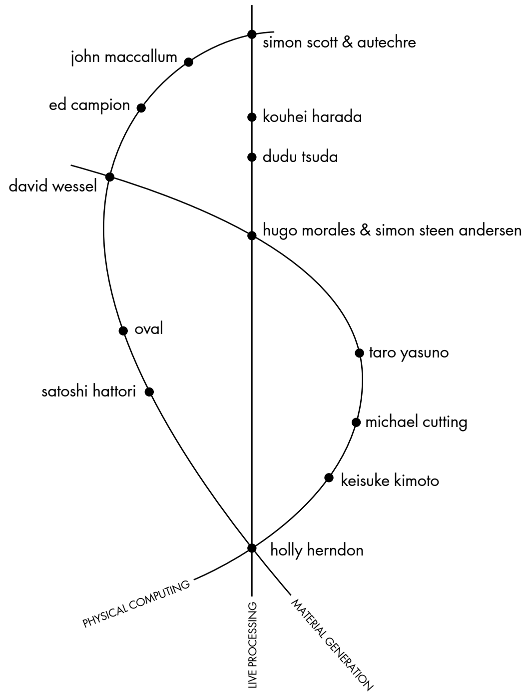


Figure 6.4 Three pervasive techniques of Max use: visualisation of artists' Max practices represented spatially along three intersecting axes – live processing, material generation and physical computing.

Credit: Joe Snape.

Physical computing, the third technique, is a term used to describe the design and implementation of systems that create an often bespoke or artisanal relationship between computers and the physical world, through engagements with both software and hardware. In this sense, the work of David Wessel, Taro Yasuno, Simon Steen Andersen, Hugo Morales, Michael Cutting and Keisuke Kimoto have something in common: mundane objects or instruments are given augmented musical capacities via the addition of sensors or through the appropriation of their output as data to sound-producing ends. Wessel, Andersen, Morales and Cutting all control the playback of audio using bespoke hardware – computer joysticks for Andersen,[37] simple switches for Morales and Cutting, sophisticated, high-resolution pressure pads for Wessel.[38] These instrumental inventions augment their live practice visually, calling to mind the material, ideological and live-performance

commitments of earlier instrument building and music research subcultures. The same holds for Yasuno and Kimoto, but to even greater degrees, for their physical computing practices achieve highly theatrical physical effects. Yasuno's *Zombie Music* patches regulate the flow of pressurised air to play a robotic recorder ensemble;[39] Kimoto's *Drone* stimulates the individual vibrations of many acoustic monochords through electromagnetic induction.[40]

If the three techniques and their associated aesthetic qualities are distinctive, they are often combined. Thus, in Herndon's performance practice, live processes are controlled in real time using homemade induction coils, while her albums are constructed from strands of audio recorded to disk from Max and then composed out on a DAW in the studio. Andersen's *Run Time Error* performance employs two computer game joysticks to play back two channels of prerecorded video and audio at variable rates. Morales' *Espacios Encordados*, in turn, embeds its performer in a dynamic system in which her movements, processed in Max, regulate the excitation of a piano's soundboard via multiple custom-designed loudspeaker cones.[41]

Evident in this account is how specific hybrid techniques of Max practice have emerged in response to the temporal paradigm and aesthetic resources offered by the software. These cultures of musical use produce an array of distinctive, recognisable aesthetic tropes in the resulting music and sound art. What is at stake is less concretely audible but no less significant than the phenomenon of help file use detailed earlier. When practitioners and critics describe something as 'sounding like Max', they articulate a sensitivity not so much to an actual sound, or a sonic marker of style or genre, but to something at once subtler and broader: the prevalence of aesthetic figures – sonic, material, visual or formal – that stem from paths of least resistance to the ways of working with time peculiar to Max. In a double bind, the technology that makes it possible for artists to forge unusual musical practices also locates those practices within familiar and consolidated technical-and-aesthetic universes. To repeat: this is less about such practices being sonically close, or cohering as genres, and more about techniques that favour the production of particular families of sounding assemblages.

Aesthetic assemblage expanded: Max, from sounding processes to performance

If, in the introduction, we posed the question of where the aesthetic resides in relation to the complex materialities of music-technological assemblages, we now broaden this problem by multiplying the mediations further. Taking a live performance by Holly Herndon, we show how the very aesthetic significance of Max's sonic properties is conditioned, indeed overdetermined, by the software's nesting within a much-expanded constellation of mediations – evident in her performance. Our aim is to convey how, notwithstanding Max's coproduction of sounds and sounding techniques, aesthetic effects cannot be reduced to the software alone, for the genesis of aesthetic effects, as of musical meaning, occurs through the constellation of music's multiple mediations (Born 1993). Indeed, 'music has no material essence but a plural and distributed material being'; it should 'be grasped as an extraordinarily complex kind of cultural object – as an aggregation of sonic, social, discursive, visual, technological, corporeal and temporal mediations: as an assemblage' (Born 2013, 138–9); Understanding how Max coproduces aesthetic effects in live performance requires an analysis of this expanded conception of the assemblage.

Herndon's 2014 performance at San Francisco's 1015 Folsom nightclub illuminates how in practice we encounter Max entangled in a web of (non-technical) mediations. In what follows we parse the relations between key mediators from that evening, discerning Max's particular contribution. 1015 Folsom is an established venue in the SoMa (South of Market) district, frequent host to international DJs and producers, known for programming fashionable acts and for its huge sound system, and occupying a prestigious position in the Bay Area electronic music scene. The venue therefore frames Herndon's music in a particular way: as worthy of presentation in one of California's most technically advanced, on-trend dance clubs.

Herndon herself emits powerful associations: she was known at the time as one of a minority of women studying for a PhD at Stanford University's world-leading Center for Computer Research in Music and Acoustics (CCRMA), with an earlier MFA in Electronic Music and Recording Media from Mills College, Oakland – renowned as a longstanding incubator of experimental music – under the tutelage of John Bischoff, James Fei, Maggi Payne and Fred Frith. Her 1015 Folsom performance was, then, buoyed by combining exceptional EDM kudos with globally elite academic and experimental music credentials.

Herndon's performance that night was enhanced by further mediations: by the prestigious company of the main act to which she was support, and by the nexus of fashionable labels through which this act's music and her own music are released. She was supporting Daniel Lopatin's Oneohtrix Point Never project. Since releasing *Returnal* (2011) on the highly influential Warp label, Lopatin has been widely recognised as a visionary producer-composer. Herndon's own music is released by Brooklyn label RVNG Intl., described by Resident Advisor – hip online music magazine and taste arbiter for the global dance music scene – as 'one of New York's pre-eminent experimental dance labels' (Coultate 2014). RVNG Intl. is known for initiating projects at the borders of club music and the classical avant-garde. Working with cultural institutions including the Barbican and MoMA PS1, RVNG presents its releases as fine art, often issuing recordings as limited editions. Wrapped in the contagious cachet engendered by her relations with this ensemble – labels, magazines, galleries, fellow artists – Herndon and her music gain a level of distinction and an aesthetic community that mediate how her performances are experienced, and the sensory pleasures they proffer.

Visual and corporeal elements of Herndon's 1015 Folsom performance also contributed aesthetic effects. Moving her arms back and forth above her laptop in loose synchrony to the music, Herndon's use of her trademark t-coil microphones lent the performance a degree of technological spectacle:[42] her movements were clearly musically significant and made the technicality of her music powerfully explicit. Through this quality of physical computing, realised in Max, Herndon's music is made distinctive from that of other laptop musicians – something that journalists have been quick to articulate, conceiving of it as innovative, an attribution sometimes linked to her Stanford PhD studies.[43] Herndon's set was accompanied by live visuals by Japanese artist Akihiko Tanaguchi: strangely warped three-dimensional renderings of home interiors. These visuals presented an uncanny collision of human and machine elements that resonated with the complex, half-alien delays of Herndon's sampled voice.[44]

The aesthetics of Herndon's performance are, then, irreducible both to musical sound and to the aesthetic qualities engendered by Max. Rather, they derive from the multiple interferences set in motion by the web of mediations described: musical and artistic, place-based, social and institutional (Bischoff, Fei, Payne, Frith, Mills, CCRMA, 1015 Folsom, the Bay Area, Lopatin, RVNG Intl., Warp, MoMA PS1 and so on), discursive, visual and technological – all of them compounding and contaminating one another, along with the sounds diffused from her laptop. Herndon's

prestigious studies at Stanford are activated technically and visually through her t-coil performance; while her idiosyncratic vocals are emphasised and enhanced through Tanaguchi's visuals. Our intention, then, is to set the arguments about Max's aesthetic propensities into relief: for just as the aesthetics of performance are created by more than sound, so Herndon's uses of Max's affordances are coproduced by other mediations in this much expanded assemblage, with its intricate internal resonances. Yet, for all the qualifications we have offered in relation to Max's catalytic participation in producing aesthetic effects, it would be a mistake to overlook the software's influential role in making Herndon's music distinctive, both sonically – through complex delay lines, for instance – and performatively – in allowing Herndon to feature spectacular and evocative physical gestures in her live work. We intend with this analysis to foreground how a plurality of additional mediators, of different scale, complement and compound in complex and emergent ways Max's mediation of the overall performance aesthetic.

Software is social: Max, institutional mediation and technical-aesthetic emergence

To grasp Max's aesthetic propensities, we have moved inside and outside Max, analysing the software's internal processes as well as its entanglement in a host of mediations as evident in cultures of use, specific sonic techniques, and performance event. In this last section, we continue to move out and scale up: we consider how the software's aesthetic capacities are evolving in relation to wider institutional changes. For Max is embedded in a particular institutional ecology, a specific nexus of social mediations that is intimately implicated in the software's ongoing transformation, forming what Max is. That institutional ecology is an asymmetrical one, however, that we trace through Cycling '74's changing relations with the German company Ableton and with the public academic research centre CNMAT, showing how these two relations are, in very different ways, vying to shape Max's future.

A powerful trajectory of change became evident in 2008 when Cycling '74 (hereafter Cycling) released Max 5. Conspicuous by its absence from the release was Pluggo, a popular extension to the Max environment that allowed users to design their own audio effects as Virtual Studio Technology (VST) plug-ins for use in other VST hosts – typically, DAWs like Logic or Pro Tools. Widely adopted, Pluggo was attractive to those seeking to exploit the sonic affordances of Max/MSP 4 while employing a workflow

centred on the DAW. Not only was Pluggo absent from the new Max 5 package, but previous versions of Pluggo were incompatible with Max 5. In May 2009, a message from Cycling announced that sales of Pluggo would be discontinued and development efforts cease. The reasoning cited the complications of supporting multiple plug-in specifications on both Mac OS X and Windows, exacerbated by a growing absence of standardisation between platforms – a strain felt by many programmers in our field sites. As Born noted of IRCAM's software environment even in the 1980s (Born 1995, 231–2, 252–8), frequent overhauls in codebase and protocol by dominant companies like Apple and Microsoft require dependent developers to invest considerable time and money to remain up-to-date.

The 2009 announcement disclosed that Cycling's development efforts would henceforth be 'focussed on a single application, Ableton Live, where [Cycling] can work directly with the developers and exert some influence over the host environment' (Zicarelli 2009). While this appeared to make strategic sense, the resulting product, an Ableton Live extension called Max for Live, had little of the flexibility of its previous incarnation, Pluggo. Operating exclusively within a single DAW, Ableton Live (hereafter Live), Max for Live corralled those with an investment in Pluggo-type workflow towards working with Live. Max for Live was thus not just an effective response to a difficult engineering challenge. It was also, crucially, a means by which to manufacture a monopoly of sorts: it created a platform lock-in between Live and Max that left former Pluggo users with little choice but to turn to Live, regardless of which DAW they had come to prefer, learn or invest in. As a Pluggo user objected: 'I love Max and I hate Live. How about the option to export patches as VST or other plug-ins? Max should be a flexible tool. With Live, Max is not flexible enough' (Holzheimer 2011).[45] The Cycling-Ableton lock-in evidences what Andrew Barry calls defensive innovation, which he links with 'anti-invention': a technical (and/or cultural) development that channels practices in a certain direction, in the process closing down alternative possibilities (Barry 2007, 297–301; cf. Born 1995). Barry (2007, 300) portrays defensive innovation as characteristic of technology firms, for which 'anti-invention can be a deliberate element of industrial or cultural strategy'. Specifically, 'the constant upgrades of computer software and hardware packages are instances of a restrictive strategy, locking users into existing configurations [and] producing enforced [and premature] obsolescence … Invention should not, therefore, be narrowly equated with technical change … [For] technical changes can be conservative in their implications …; they may restrict and displace the possibility of alternative developments' (Barry 2007, 299).

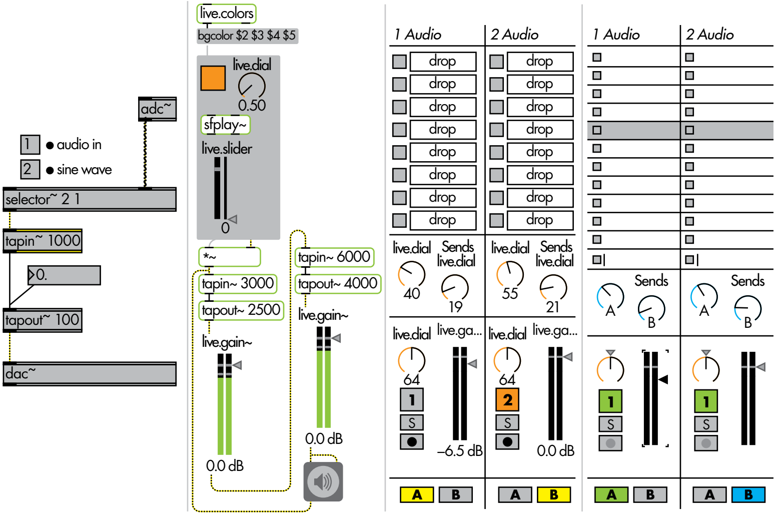


Figure 6.5 Four GUI views from Max/MSP and Ableton Live showing how it became possible to reproduce the visual aesthetic of Ableton Live's GUI in Max 5.

Credit: Joe Snape.

The effects of such defensive innovation in music software are more than technical. For the ways in which Max for Live has reconfigured Max since 2009 combines technical changes with marked shifts in aesthetic affordances. In a number of ways – visually, functionally and aesthetically – the redesign of Max 5 signalled a convergence with Ableton Live. With Max 5, a new species of so-called 'Live objects' began to ship alongside traditional Max objects, allowing users to reproduce the functionality and visual style of Ableton Live in their Max patches. As an influential commentator noted, Max 5's 'graphical components are sparse and simple … in fact, Max 5 now looks rather like Ableton Live' (Rothwell 2008). The visual changes to the interface were far from decorative: they performed an intended overlap between the technical space that is Max 5 and that of Ableton Live. Figure 6.5 illustrates the convergence through four GUI views.

As Figure 6.5 shows, juxtaposing the four GUI views, the introduction of Live objects in Max 5 made it possible to reproduce the visual aesthetic of Ableton Live's GUI in Max. The leftmost view shows a simple delay line in Max/MSP 4. The second-from-left view shows a slightly more elaborate delay line constructed in Max 5 using a variety of

Live objects: note the marked difference in visual aesthetic. The rightmost image is a screenshot of Ableton Live 8 in session view. The second-from-right view is an extreme demonstration of just how closely the visual aesthetic of Live may be reproduced in Max 5, with recourse only to the GUI objects with which the software ships.

In particular, the visual interface changes draw attention to how Max for Live, in integrating Max within the Live environment, strenuously reconfigures Max's temporality. Most obviously, Max for Live's audio engine handles the synchronisation of parallel events in a predictable, robust way. Stretching clips of audio to play in time with each other is facilitated by an algorithm that automatically matches heterogeneous tempos through beat detection. Achieving these effects in Max alone is 'non-trivial' – developer-speak for extremely difficult. As significantly, Max for Live offers users access to Ableton Live's traditional GUI: its left-to-right timeline and 'session view'. This allows users not only to track compositions conventionally, but to automate parameter changes within a patch over a fixed, timelined duration, without requiring the laborious implementation of a system to do so within Max. With Max effectively configured as a plug-in extension to Ableton Live, Max for Live users gain access to modes of temporal abstraction – and sophisticated visual representations of those abstractions – alien to previous versions of Max.

The technical convergence of Max with Ableton Live is not only a matter of local practices, however: it has also participated in the historical emergence of a distinct musical aesthetic. Notably, Max for Live has been a conduit opening up musical expressions in the space between dance floor and experimental music idioms. Artists like Holly Herndon typify this trend, along with interlocutors including Satoshi Hattori and Cycling employees Jeff Lubow and Sam Tarakajian. Characteristically, this music is rooted in EDM, yet reaches out towards the physical computing and unpulsed sonic aesthetics associated with Max. Such practices are marked by an engagement with the circulation of Max for Live devices since 2009: ready-made units with particular aesthetic propensities produced by users and made available to download online. Though a multitude of such devices exist (over 3,000 are currently available online), they overwhelmingly fulfil the role of sonic embellishments to pulsed, danceable music; particularly prevalent are delay lines and devices that produce abstract visuals in response to audio inputs.[46] Thus, while Max for Live engenders musical results that exploit the distinct aesthetic potentials of the two software environments, they are not exploited equally. Instead it fosters a palpable aesthetic hierarchy, which mirrors the technical hierarchy: for Max runs as a plug-in *within* the Live environment, and not vice-versa.

It is in light of these entangled technical, visual and musical trajectories that we can make sense of the institutional developments accompanying them. For Cycling's alliance with Ableton aims to link Max's developer to a successful company enjoying a phase of speedy growth. Given the huge uptake of Ableton Live by electronic dance musicians worldwide, Ableton has capitalised on its software's fashionable status through collaborations with hardware companies – Akai, for instance – and a prestigious educational scheme – its Ableton Certified Trainer programme. Such ventures involve a rapid expansion of Ableton's operations, located in offices in Berlin and Pasadena, CA. For Cycling, pairing Max with one of the world's fastest-growing DAW developers is an opportunity to significantly increase its visibility, circulation and profitability. As part of the partnership, the companies offer a 'crossgrade' licence: users who purchase Ableton Live Suite, which comes with Max for Live, can upgrade to the latest version of Max at reduced price. During the fieldwork period, the corporate tie-in was concretised spatially: Cycling's only permanent office space was a sublet from Ableton's Berlin head offices. All that remained physically of Cycling in San Francisco was a rented meeting room. The shared Berlin workplace was, then, both a spatial metaphor for and an incubator of the social and material convergence between the two operations, ongoing since 2007.

Indeed, in 2017, Ableton and Cycling announced a partnership 'with Cycling '74 remaining a separate and independently run entity, wholly owned by Ableton' (Ableton 2017). Since then, their products are more integrated than ever and share stronger resemblances, and their online news pages regularly invoke one another to advertise the synergies between products. If such corporate alliances show the pressure of economic interest, this is not to suggest that they are formed merely opportunistically. Certainly, once underway, they instigate far-reaching changes in working practice, with implications for users through the changing design and aesthetic affordances of both product series. But the mediation is two-way: for while economic fragility may impel a company like Cycling into alliance with a stronger competitor, undoubted stimuli and preconditions for such institutional change are the imagination both of new markets and of novel aesthetic possibilities (Born 2007), intimately linked to the envisaging of an altered visual interface and technical architecture.

During fieldwork, a quite different set of institutional relations were being cultivated between Cycling and its non-commercial partners, embodying the asymmetry of which we wrote earlier. In 2014, across the Bay in Berkeley, a team of programmers at the UCB-based CNMAT were

working excitedly on a large collection of Max externals. The team was led by Adrian Freed, formerly of IRCAM, and comprised three full-time engineers: a postdoctoral fellow, Francis, and two institute employees, Al and Jake. Up to ten further engineers, all graduate and undergraduate students at UCB, worked for free or for course credits. In recent years, one of their most successful projects is Open Sound Control (OSC), an alternative messaging paradigm to the pervasive MIDI, and one used by many practitioners for handling dataflow inside Max.

As Jake explained, OSC is advantageous in two important ways. First, OSC is designed to be 'self-documenting', in that its syntax is closer to English than Max MIDI objects: 'it's humanly readable, so instead of a MIDI list of values where you have to figure out which values refer to channel number, note number and velocity, here you see actual names'.[47] Second, bundles of more than one event can be conveyed at once, allowing the representation of common simultaneous musical events, like chords. With Max's MIDI objects, this isn't possible: chords are conveyed as individual notes streamed in rapid succession. This brings challenges at once real and existential: when is a stream of notes a chord, and when just a stream of notes? As Francis feelingly put it, 'it's a nightmare. It's not trivial at all'.

One of the major domains of musical practice in which this issue is pertinent is telematic musical performance, where control data as well as audio data are shared across networks over very large distances. In Max, parsing arriving data, reformatting it and packaging it appropriately for output can be unwieldy for reasons tied up with graphical programming paradigms: many objects are required to separate data of different types, and more still to transform that data and move it on. This is magnified by the precarity of sequential messaging over such networks, in which the order of transmission does not necessarily predict the order of reception; if a set of variables arrives in a scrambled order, it can result in undesired musical behaviour or, worse, a crash. By transmitting sets of variables as single packages, OSC offers a robust alternative not prone to such errors. In these ways OSC is a powerful facilitator for telematics, a sprawling-out of Max from its native limitations – a generative mutation undertaken by knowing engineers, outside the ranks of Cycling.

As a result, a large international community of Max users are heavily invested in OSC. Yet despite this, OSC is not natively supported by Cycling for Max, and must be downloaded and installed by interested users. The question of OSC's relation to Max seemed a delicate one during fieldwork; early on, CNMAT engineer Francis initiated a discussion with Cycling's management regarding the possibility of including OSC in Max's

codebase. Though Cycling were happy to support CNMAT's research by sharing proprietary code, they made no commitment to integrating it. Paul, a Cycling developer, justified the company's position as follows:

> The number of things that people want to do in the domain of signal processing with computers is *massive* … You're right, there's native MIDI support in Max, but not OSC. And I think that's because the CNMAT support has always been good enough. There's a pretty good OSC library, CNMAT is very happy to continue working on it. So there's no real organic need to integrate it.

Here, Paul admits that, in Cycling's view, while it is appropriate for Max to offer native support for MIDI, CNMAT's external support for OSC is sufficient: the situation works well. In this way he firmly, if implicitly, establishes that the relation between Cycling and CNMAT is a symbiotic yet asymmetrical one: together, they form a hybrid, commercial-public entity in which CNMAT supplies some of the necessary labour, development and support that Cycling chooses not to prioritise.

The asymmetrical relation between CNMAT and Cycling is magnified in a recent development; for despite its success, OSC is seen by CNMAT engineers as a precursor to a far more important project called 'odot': an encompassing system for formatting, conveying and processing data. Initially developed within Max, odot is intended by its designers to radically reduce the barriers to working in multiple software environments at once. It does this by offering a programming *lingua franca* – based on the same principles as OSC – that can function inside not only Max, but other programming idioms including PD, Javascript and Python. In this vision, Max is dethroned, becoming just one among other environments. As CNMAT's Francis puts it, 'we're in the business of building objects that very easily allow you to create middleware between different software'. It happens that many CNMAT practitioners pursue musical practices that require data to be repeatedly translated from one language to another as it circulates between what were previously incommensurable software environments. This entails laborious coding, and odot is intended to remove the need for these translations.[48] In this way, Francis explains, 'you can create this whole rich world of processing'. Indeed, driving the odot paradigm is the equation of rich processing with rich sonic outcomes – a stance articulated concretely by odot's lead designer Adrian Freed, who explained that a core aim of the project is to 'increase the diversity of musical outcomes by facilitating mash-ups between production tools'. At CNMAT, a research culture where technical heterogeneity thrives and is

prized, such heterogeneity is linked to the sustenance of aesthetic multiplicity and on these grounds is devotedly pursued. Infusing CNMAT's research culture, then, are reflexive philosophical positions regarding precisely the theme of this chapter: the mutual mediation of technology and aesthetics.

It is therefore striking that where Cycling and Ableton have collaborated to create a nesting of Max within Live – effecting a reduction of the heterogeneity and specificity of both environments through their assimilation – CNMAT seeks with odot to do the opposite: to preserve the integrity of differences between environments by creating ways of working more readily and fluently with multiple, diverse music platforms. The palpable asymmetries in the technical-aesthetic aspirations we have identified are paralleled at the inter-institutional level. If Cycling has tenanted Ableton's Berlin headquarters while benefiting commercially from the tie-ins, then a different asymmetry prevails between Cycling and CNMAT, the former a commercial operation, the latter a publicly funded, non-commercial entity. For CNMAT has been expected to gift its labour, development and support to Cycling's Max environment. It is clear what Cycling gains from the arrangement: like the vast, free technical support network that Max users provide for each other via the online Max forum, OSC benefits Max by providing a powerful array of additional functions at no cost to Cycling. The potential gains for CNMAT, however, are less obvious. True enough, uptake of OSC and odot externals among a significant portion of the huge global Max user population expands the circulation of CNMAT's project beyond its Berkeley base, attracting legitimation from the international computer music community.[49] Further, the working ties maintained between Cycling and CNMAT through Max-related projects involve social ties: exchanges of personnel, information and largesse. Cycling CEO David Zicarelli's annual talk at CNMAT's Max summer school is often cited as a valuable outcome of links between the organisations, and students affiliated with the centre occasionally perform user tests on new versions of Max, gaining early access to the software that is regarded as exciting and prestigious. Working on Max externals at CNMAT is, moreover, a passionate endeavour: CNMAT engineers are deeply invested in the project, both ethical and aesthetic, of making Max better and more musical to use.

Yet notwithstanding these potential gains, a complex relationship emerges in which the freely available products of publicly funded intellectual labour come significantly to enrich existing proprietary structures, with uncertain, indirect and usually non-monetary returns. Thus, while CNMAT pursues a research programme at UC Berkeley

largely free from top-down University injunctions – developing technologies in 'a different temporality to commercial product timelines', technologies whose success can be gauged by the extent, consequent on their free release, of their thriving within the public sphere – the centre's objectives nonetheless appear compatible with a management injunction at the University of California to foster research partnerships that cross the proprietary divide. A leading CNMAT figure explained that the centre is motivated not by the prospect of 'success as judged by output or product' but rather by the 'creative opportunities produced' through relations with industry. Yet CNMAT's endeavours are embedded in a research management system, embodied in the University's office of Intellectual Property and Industry Research Alliances, that actively seeks to link publicly-funded research to commerce so as to '[enhance] the university's research enterprise' and provide a 'critical economic driver for the Bay Area and State of California'.[50] When set in context, this asymmetry is only amplified: CNMAT is one of many third-party developers engaged in similar Max-based projects. Cycling, then, is productively positioned as a private node within an extensive network of public and *pro bono* development, free to assist with projects it recognises as potentially valuable, but also free not to assist. The logic that drives this arrangement also ensures its security: it dictates that the most successful, best-managed – and thus most valuable – external projects are also those least likely to require Cycling's attention or investment. After all, in Paul's words, if external (non-profit) developers are happy to keep working on projects in their bids for academic prestige and peer-group kudos, an 'organic need' to integrate or recompense them is unlikely ever to arise.

At this point we can discern a third encompassing asymmetry at work in this institutional ecology: between the relation of Ableton and Cycling, on the one hand, and that of Cycling and CNMAT, on the other. For where the first couplet amounts to a commercial alliance in which Ableton has encompassed its erstwhile rival and may derive added profitability from this situation, in the second couplet it is CNMAT that delivers added value to Cycling. The overall flow of the realisation of monetary value is therefore starkly one-way: from CNMAT to Cycling, from Cycling to Ableton – from public university to private company, company to corporation. This is, we suggest, an inter-institutional ecology symptomatic of the digital-cultural economy of our times: one in which, at base, the private-private alliance reduces the space of possibilities – through defensive innovation and anti-invention – while the public-private relation strives repeatedly, through gifting, to prise open and enrich the space of possibilities. If Max retains its significance as a global

digital-music vernacular, then these uneven mediations amount to a dynamic in which, while Cycling and Ableton are vested in producing novelty in the user experience, both companies also appear impelled to constrict certain developmental avenues under the imperative of retaining proprietary enclosures over a promiscuous sociotechnical space. CNMAT, on the other hand, has no such interest at all.

Conclusion

What is a musical instrument? One of the virtues of critical organology is that it turns our attention to the materiality, design and use of instruments. But in doing so it assumes that instruments have clear and well-bounded physical forms (such as the *sarangi* or *saz*), even if they evolve over time. Certainly, Max can plausibly be conceived as a type of musical instrument; but Max is also much more, destabilising what we mean both by an instrument and by its materiality. For the assemblages engendered by the life of the Max software, we have shown, problematise a series of dualisms or distinctions – between score and instrument, composition and performance, composition and improvisation, improvisation and computer programming, sonic and visual, analogue and digital, material and immaterial, human and nonhuman, culture and technology. They demand that we notice both the haecceity, complexity and opacity and the coproductive, relational properties of code, and that we trace richly the specific and evolving cultures of music software in its technical-and-musical use. In Mark Fell's patch, Al's immersive patching practice and Holly Herndon's 1015 Folsom performance, we showed how difficult it is to make an interpretive 'cut' (Barad 2007) between technicity and musical expression.

In our review of theories of mediation, we took Lucy Suchman's side in the debate over agency. Against actor-network theories that posit the agency of humans and nonhumans as symmetrical, we recognise their 'durable asymmetry' and differences, as well as their 'deep mutual constitution … without losing their particularities' (Suchman 2007, 3). Notable among the differences, for Suchman, is 'the fact that persons … are those actants that conceive and initiate technological projects, and configure material-semiotic networks'; foremost among the particularities, we have shown in regard to music technologies, are the human aesthetic sensibilities mobilised in their configuration and use. Yet in this chapter we have also revised this debate, working, crucially, against its ahistorical and acultural, overly philosophical and/or microsociological grain, to show

how imperative it is to scale up and move out, beyond purified situations of Max use. We have insisted on charting Max's history and a patch's internal functioning, observing cultures of Max practice and an actual performance situation, noticing characteristic aesthetic propensities along with the emergence of certain Max-inflected musical and performance genres. We have crossed scales, suturing analytically the apparently yawning gap between revisions of Max's codebase or visual interface and movements in its political economy as they are manifest in its complex and evolving institutional ecology.

We have seen, then, that Max is only a partner in, or a coproducer of, any musical or artistic practice in which the software is employed. Moreover, through the analysis of Max's institutional ecology it has become clear that it is no longer possible narrowly to equate technical change with invention, for conceptualising invention in relation to Max necessitates addressing invention in the larger sense of its aesthetic possibilities – what Max makes possible sonically, musically, artistically. In theorising the technical and industrial developments that augur defensive innovation, Andrew Barry develops his case against facile equations of technical novelty with innovation, and innovation with genuine invention. Inventiveness, he contends, 'can be viewed as an index of the degree to which an object or practice is associated with *opening up possibilities*'. Yet 'what is inventive is not the novelty of artefacts or devices in themselves, but the novelty of the arrangements with other objects and activities within which artefacts' are situated (Barry 2007, 299–300). If Max demands that we consider the software 'instrument' not as an object but as an assemblage, then it follows that Max's inventiveness has to be judged historically in the expanded terms of the assemblage.

We have shown, in addition, that Max as an assemblage is far from stable. The instabilities of Max are not merely local matters of the continuous flux of new acquisitions and accretions circulating online and offline between developers and users, and users and users – the constant 'attritional time' (Lazar 2014) produced by the appearance and life-course of patches, plug-ins, sub-routines, downloads, fixes and so on. Max does not evolve linearly and progressively, if unsteadily, over time. It is chronically unstable in the present (cf. Born 1996, 1997), and our chapter has described its instabilities ethnographically. But Max's instabilities also usher in, and reflect, a politics – a politics at once of technological and musical possibilities, a politics in circulation among Max developers and users. This is a politics that is strengthened conceptually by Barry's intervention. For we are now equipped conceptually to interrogate: when is technical(-and-aesthetic) change generative? When is the stabilisation

of music-technological tools, whether hardware or software, productive in what it makes possible, and when a form of defensive innovation likely to have anti-inventive or uncreative effects? When does a music platform excessively mark or constrict the forms of expression that it fosters? And which institutional ecologies and alliances are likely to be supportive of diverse, inventive (technical-and-)aesthetic directions, and which less so?

In one light, our chapter plays back to itself a field energetically and reflexively in motion, as we have conveyed through the words and reflections of our interlocutors. To raise these dynamic questions reflects the way such matters arise among Max practitioners themselves. But we hope the case of Max, as we have analysed it, can also help to enlarge the existing space of critical reflection, encouraging moves beyond both 'the technology itself' and 'the music itself' towards a critical model fit for the complex assemblages we have identified: from the micro-operations of patch and user, through cultures of use, performance situations, prevalent sounds and techniques, to institutional ecologies. In another light, we have tried to render explicit what may be implicit or half-articulated, to trace linkages and local and less-local causalities and their effects. At base, our challenge has been to promote the inventiveness of the hybrids accounted for here, as well as collective awareness of the factors involved in such inventiveness.

Notes

1 Since its release Max has been known as 'Max', 'Max/MSP' and 'Max/MSP/Jitter'. We refer to the software as Max, unless referring to a specific version.
2 Cycling '74, cited on Goldsmiths, University of London's Max/MSP summer course webpage 2013. https://web.archive.org/web/20120720063533/http://www.gold.ac.uk/ems/courses/.
3 Cebec (2006), Lebeau (2008), and Schuette (2013), respectively.
4 See Born (1995, chs. 7 and 11); and for similar general arguments about vanishing mediation and discourses of transparency, see Sterne (2003, 147, 218, 225).
5 Snape's fieldwork involved taking classes, conducting interviews, observing coding sessions, attending and performing in concerts, and close reading of the copious output of Max online forums.
6 See the argument in Rothenbuhler and Peters (1997).
7 See Born and Barry (2018) on the question of specificity in relation to ANT.
8 We knowingly diffract, through music, Haraway's critique of universalising epistemologies of science: 'I am arguing for politics and epistemologies of location, positioning, and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims … I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity' (Haraway 1988, 589).
9 This is a theme of Valiquet's research on digital musicians in Montreal (ch. 7; Valiquet 2014) and of Born's UK study (ch. 8). See Born (2002, 2005) on genre-specific aesthetic and ethical reflexivities among cultural producers.
10 The ambivalence of critical organology in these terms – its fluctuation between a focus on 'things'

and the analysis of digital music materialities as assemblages – is played out in Hennion and Levaux (2021), a collection bringing STS to music studies. See the contrasts between Harkins (2021, which focuses on the Fairlight CMI) and Bates (2021) and Prior (2021; cf. Prior 2018).

11 The field of software studies has been disappointing in this regard: rather than begin from an analysis of the composite materiality of software, it tends to disaggregate software into particular components (Fuller 2008).

12 See, for example, Pinch and Trocco (2002), Pinch and Bijsterveld (2003; 2004), Zimmerman (2015). Symptomatic is how Pinch and Bijsterveld (2003, 543–6, 551), in their history of electronic music instruments, find it necessary to address musical and aesthetic qualities, but without allowing this dimension to register in their theoretical approach, drawn from STS. Similarly Pickering (2010), while acknowledging questions of aesthetics, does not allow this to register as a conceptual challenge. For an early attempt to address the aesthetic in an analysis of the history and culture of computer music technologies, see Born (1995), and for an ethnography of an online music scene which briefly analyses the aesthetic qualities of the music produced, Lysloff (2003).

13 See ch. 10, the postlude (455–64) on the four planes of social mediation of music.

14 For clarity, and consistency with the software, the names of Max objects are rendered in **bold** and without capitalisation.

15 MIDI (Musical Instrument Digital Interface) is a protocol for allowing electronic musical instruments, computers and synthesisers to communicate with one another. In this way MIDI enables musicians to make routine use of powerful systems of intercommunicating analogue and digital music devices.

16 On self-organisation see Varela, Maturana and Uribe (1974), Varela (1981). For a critical discussion of the limits of theories of self-organisation, with which we concur, see Hayles (1999, 10–11).

17 For a historical account of the Music–N programs, see Manning (2013 [1985]).

18 For a rich, German-language history of Max's development beyond the IRCAM years, see Scholl (2014, ch. 2).

19 See, in particular, the account of composer Alejandro Viñao's frustrated attempts to work with the CHANT program (Born 1995, 235–245).

20 The pedagogical presentation of Max as intrinsically complex scientifically and mathematically appeared invariably to have the effect, internationally, of putting off women students from using it. This gendered effect was astonishingly consistent in our fieldwork in the US, Montreal and the UK.

21 Third-party developers notable for contributions of these kinds include Concordia's Hexagram and McGill's Input Devices and Music Interaction Laboratory, as are individuals like Masayuki Akamatsu (IAMAS), Eric Lyon (Virginia Tech) and Tristan Jehan (The Echo Nest/Spotify).

22 Help files and example patches can be manipulated in exactly the same way as a user-made patch. Max users commonly copy assemblages of help or example patches wholesale into their own patch, to produce sound quickly. In Figure 6.2, the leftmost assemblage shows patcher-level code; the rightmost shows the code contents of the **gen~** object depicted in the leftmost assemblage, as the circle and arrow indicate.

23 **gen~ karplus-strong** is an implementation of a classic plucked string physical model algorithm developed by Alexander Strong and Kevin Karplus at Stanford in the early 1980s.

24 **float** is a number object for decimal numbers, positive and negative. It is used in any arithmetical situations in which **integer** precision is not appropriate.

25 In particular, Figure 6.3 indicates Al's copy-and-paste use of encapsulated (or abstracted) code – higher-order arrangements of objects condensed into a single, easily collaged pseudo-object – which can be glimpsed in the form of **p_js time tasks X4** (centre right) and **dot.interpolate4~** (bottom left).

26 **dot.interpolate4~** is an encapsulation (or abstraction) produced by the Input Devices and Music Interaction Lab at McGill. It morphs spectrally between two sound sources to produce a third.

27 **pictslider** is a GUI object that allows users to map an image across a two-dimensional control space. Al chooses to use **pictslider** without making use of this function, as a simple x/y controller.

28 **live.gain~** is an object that scales the magnitude of audio signals that arrive at its inlet before passing them on. Its difference to **gain~** is its visual appearance: **live.gain~** is based on the gain sliders native to Ableton. In early 2014, this was an indicator of Max's convergence with Ableton Live, which we address later in the chapter.

29 **gen~** is a special kind of object that abstracts lower-level code specified by the object's name; in this case, 'karplus strong'. As a hybrid of object and encapsulation, it circulates in exactly the way that regular objects do.

30 German musician Robert Henke, known also as Monolake, is renowned for his cocreation of Ableton Live and his influential role in the development of Max for Live.

31 See https://soundcloud.com/kouhei-harada/3-max-msp-improvisation-waapa and https://www.youtube.com/watch?v=-QF03yPeGbg for examples of Harada's and Scott's work. Accessed 31 January 2022.

32 An archive of this performance is available online: https://www.youtube.com/watch?v=EOSSEAOhsrI. Accessed 31 January 2022.

33 See Herndon's video interview with Pitchfork: https://pitchfork.com/tv/11-pitchfork-weekly/600-holly-herndon-defends-laptop-musicians, especially 4m 20s – 4m 50s. No longer available.

34 See https://www.youtube.com/watch?v=BQFQIy1su2g and https://www.youtube.com/watch?v=vvW6qiTkZdw for examples of Autechre's and Oval's music. Accessed 31 January 2022.

35 See Théberge (2013) on this *reversal* of the earlier practice characteristic of the several centuries in which music notation prevailed in composition, preceding and determining performance. Here, instead, performance is recorded and then rendered into notation, to be worked with musically later.

36 See Modabber and Mourles (2013) at https://www.youtube.com/watch?v=BCDjCfu9bGQ&list=PLakbT2bFWUQQ8Ash1Vrbb7B5iDnBbcl-Z. Accessed 31 January 2022. Mourles' performance ran in the Max clone, Pure Data (PD). Though PD is distinct from Max in certain minor ways, in the context of this discussion the two are technically and aesthetically interchangeable. This is reflected in their history: following his time developing the first iterations of Max at IRCAM between1985 and 1993, Miller Puckette began work on PD when he moved to UCSD in 1994 as a means by which to bring Max's faster-than-sound processing capabilities to a wider audience through a further-developed, open-source version of the Max techniques developed in Paris. It is around this time that generic personal computers were becoming powerful enough to make audio signal processing a viable practice beyond specialist research institutes in universities (for more on this see Puckette 2002: 33–35).

37 See *Run Time Error* at https://vimeo.com/17403233. In performance, Andersen steers each of the two audio/video channels with independent joysticks.

38 See Wessel (2009) at https://cnmat.berkeley.edu/sites/default/files/attachments/2016_David_Wessel%27s_Slabs_Freed.pdf. Accessed 31 January 2022.

39 See Yasuno (2014) at http://zombie.poino.net/index-eng.html. Accessed 31 January 2022.

40 For documentation of Kimoto's installation version of *Drone*, see https://vimeo.com/79159449. No longer available.

41 See Morales (2013) at https://vimeo.com/61881893. Accessed 31 January 2022.

42 T-coil microphones are sensitive to electromagnetic fields. By moving these microphones towards and away from her laptop, Herndon picks up the magnetic field produced by the electronics inside the machine, producing variations in signal that can be used, via Max, to drive musical processes. While the process is straightforward, the impression is of technological wizardry.

43 See interviews in *Dummy* magazine and *The Quietus* at https://www.dummymag.com/features/holly-herndon-interview and https://thequietus.com/articles/10997-holly-herndon-interview-movement, respectively. Accessed 31 January 2022.

44 See Herndon (2014) for a fixed-media version of the music and visuals discussed: https://www.youtube.com/watch?v=nHujh3yA3BE&ab_channel=RVNGIntl. Accessed 25 January 2022.

45 Holzheimer was writing in response to Zicarelli's (2009) post, itself a response to a thread initiated by disgruntled members of the Max community.

46 The Gantz Graf Live device, one such popular visuals generator, imitates the visual aesthetic of the 2002 Autechre music video 'Gantz Graf', after which it is named. At the time of writing its various versions had been downloaded almost 20,000 times. Max for Live devices are widely available at third-party repositories maxforlive.com and maxforcats.com, as well as through the Cycling and Ableton websites.

47 On the challenges posed in the 1980s by the documentation of software, and thus the communication of its functionality, see Born (1995, 225–28; 1996; 1997). OSC's implementation of 'humanly readable', 'self-documenting' code is clearly intended as a solution to this chronic problem.

48 If odot sounds here like a means of standardisation, it is not: it provides a framework for users to define for themselves the ways in which data is conveyed, setting it apart from digital standards like MIDI.

49 This is demonstrated by the passionate endorsements of CNMAT's new odot paradigm on the Cycling '74 forums: https://cycling74.com/forums/method-of-collecting-incoming-osc-namespaces. No longer available.

50 See 'About IPIRA' at https://matome.naver.jp/odai/2134002088268573101. No longer available. On Berkeley's current IPIRA, see https://ipira.berkeley.edu/about-us. Accessed 25 January 2022.

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7
Remediating modernism: on the digital ends of Montreal's electroacoustic tradition

Patrick Valiquet

In the autumn of 2011 the board of directors of the Conseil des Arts et des lettres du Québec (CALQ) initiated a series of 'digital' reforms to its funding provision for the province's artists and musicians.[1] Among producers and intermediaries in Montreal's high-profile multimedia and performing arts scenes – a public which the CALQ addressed both as its most powerful lobbying force and as its principal 'clientele' – the attention signalled a recognition of their ongoing investment in local politics and economic development. Embellished with an organically charged rhetoric of 'mutation', 'sustainable development' and 'evolution', the letter opening the report assured its readers that the digital future they imagined in their creative practices was also the best way to ensure the survival of Quebecois culture.

> In many domains today, among them that of culture, traditional mechanisms of recognition and notions of professionalism and excellence are in mutation, thereby redefining the role of organizations and support infrastructures.
>
> The channels of production in the culture industry are changing, artistic practices evolving, access to the Internet at very high speeds becoming strategic, and users transforming themselves into content producers. The sum of these observations calls for a revision of public policies and government structures in the cultural sector.

> In the end, integrating the principles of sustainable development in the framework of every government policy or strategy reflects the importance of ensuring that present choices do not prevent future generations from responding to their own needs. The demographic situation in Quebec and the context of the rationalization of state resources call for an optimization, even a redefinition of current processes and mechanisms. Digital technologies may help Quebecois society to realize this shift. In order that future generations will be able to succeed at evolving in this context, many actions must be taken right now. (Béliveau-Paquin et al. 2011, 3)[2]

Note the way in which the ecological rhetoric smooths the transition from a set of concrete economic challenges – the breakdown of professional pathways and the need for efficiency in public institutions – to a call to streamline cultural production for the sake of future generations. What is at stake is the very modernity of Quebecois society. Digital technologies promise to harness and reorientate the work of consumers, and thereby empower cultural citizenship on a grand historical scale.

For the report's audience this would have been a familiar prognosis. The project of Quebecois modernity has invested a great deal in the cultural promise of technological progress. Montreal in particular has a longstanding reputation as a cultural crucible, which both anglophone and francophone media often justify by contrasting it with the imagined cultural homogeneity of the rest of North America. Surviving as the dominant metropolis of a lost francophone 'archipelago' scattered across a majority anglophone continent, Montreal indexes a subversive sense of European sophistication in the face of a dominant American empire (Louder and Waddell 2007; Marshall 2009). This preconceived otherness has a profound effect on cultural life. Funding designed to preserve the city's unique cultural status flows from all levels of government. The most recent wave, which began at the turn of the millennium after the near calamity of Quebec's second attempt to achieve sovereignty by referendum in 1995, has favoured the multimedia industry as a new driver of economic growth. One of its primary motivations was to compensate for the collapse of the city's shipping and industrial base, which had languished over the preceding 30 years of economic and constitutional turmoil (Germain and Rose 2000). Many of the institutions targeted by the new digital arts policy also owed at least part of their existence to the post-Fordist gentrification policies that filled Montreal's once yawning economic gaps (Pilati and Tremblay 2007). Real and imaginary had thus worked together to stage

Montreal as the natural home of Quebec's – and by extension Canada's – digital revolution.

The last decades of the twentieth century also saw Montreal earn a reputation as one of the main hubs of the transnational electroacoustic circuit. The scene has a reputation as a melting pot of European and North American sounds. The francophone studios established at the Conservatoire de Montréal and the Université de Montréal in the 1970s and 80s were largely identified with the research conventions of acousmatic music, an auditory and compositional practice invented by the Parisian Groupe de Recherches Musicales (GRM) (Dhomont 1996; Beaucage 2008). Meanwhile, the anglophone composers at McGill University developed what seemed to their neighbours a more 'American' approach, linking experimental electronic sound-making with research in psychoacoustics, sound engineering and digital instruments (Stubley 2008). The smaller studios at Concordia University and the Université du Québec à Montréal (UQAM) focused mainly on practical education, but also played a key role in developing professional support networks. In spite of its internal differences, however, the scene mounted few challenges to the aura of detached, modernist formalism that accrued to academic electroacoustic composition on both sides of the Atlantic at the time in places like Paris and Stanford (Menger 1983; McClary 1989; Born 1995; Pasler 2008). Intermedia work, for example, flourished primarily in the gaps between academia, experimental theatre and the multimedia industry (Charrieras 2010). Then, by the middle of the 1990s, a strong enough network of media production companies, software startups, artist-run centres, unlicensed loft venues and nightclubs had formed to pose a threat to the hegemony of the academic studios (Schmidt 2010). Soon the 'media art' sector had established important institutions and festivals of its own, inspired and partly supported by international art and technology organisations like Transmediale, Ars Electronica and the International Symposium on Electronic Arts (ISEA). Indeed, the media arts' own independent council had anticipated the CALQ initiatives with its own *états généraux* in 2008 (Conseil Québécois des Arts Médiatiques 2009). Reform efforts such as the 2011 CALQ digital arts forums thus addressed a public that folded the electroacoustician into a larger whole. From now on it would be the interdisciplinary media artist whose work would be considered as the measure of innovation. Explanations for the shift emphasised the move to a digital marketplace: if the electroacoustic aesthetic had declined, it was because academic studios no longer had a monopoly on access to technologies now available for free or at low cost on the internet.

Of course, such claims of consumer empowerment and institutional flattening also have a global dimension. And the familiar litany of digital effects the CALQ report seems to invoke is not particular to cultural professionals. Elsewhere digital technology has also been said to shorten the attention span, threaten the centrality of 'liveness' and undermine Western traditions of concentrated, receptive listening (Sterne 2006; Emmerson 2007; Levitin 2015; Harper 2017). Many have credited the digital with reshaping the field of cultural production to model principles of 'openness' and 'democracy' (Kelty 2005). Political claims like these have accompanied digital communication since its invention (Turner 2006). The digital's articulation with modern liberalism now functions almost as naturally as the way particular digital applications afford characteristic sounds (Katz 2004; Brøvig-Hanssen and Danielsen 2016). And yet the practices included in accounts of the digital revolution do not always depend on specifically digital technologies: analogue, mechanical, environmental, relational and conceptual practices appear also to have been empowered by the digital (Born 2012b).

My interest is in the role such claims about the politics of the digital play in attempts by cultural institutions to police the intersection between media and aesthetics. In his work on data forensics, Matthew Kirschenbaum (2008, 36) emphasises the way in which 'popular representations of a medium, socially constructed and culturally activated to perform specific kinds of work' are substituted by theorists for a 'comprehensive treatment of the material particulars of a given technology'. For Kirschenbaum, the meaning of this substitution lies in the way in which 'Western consumer culture' has 'succeeded in evolving sophisticated and compelling conceits for depicting information as an essence unto itself, or more properly, information as a synthetic (at times even haptic) commodity' (Kirschenbaum 2008, 38). But what Kirschenbaum's analysis does not provide is a strong sense of the cultural work such ideological tropes help their believers to achieve. Here, then, I take an approach informed by the work of the linguistic anthropologist Ilana Gershon (2010), who describes a 'media ideology' as a culturally and historically specific understanding of the way in which media shape communication and determine what utterances are appropriate to a given channel or device. The way in which cultural institutions determine which practices are properly 'digital' depends less on any actual use or material operation of the technologies in question than on the cultural and political ideals that they represent. Institutional commitment to these representations structures the ambitions and capabilities of practitioners to such an extent that their practices can seem to take on their ideals as

essential properties. More than any specific material thing, then, what is at stake is the construction of the digital as what Karin Knorr Cetina (2001) has called an 'epistemic object', an inherently open and processual symbolic whole that can take on new properties as knowledge and practice develop over time.

Of course, there is no shortage of accounts identifying the aesthetic 'traits' which are unique to digital technologies. Ragnhild Brøvig-Hanssen and Anne Danielsen (Brøvig-Hanssen 2010), for instance, tell us that we hear certain musical gestures as digital in varying degrees because the musicians in question have chosen to amplify the corresponding material features of the technologies they use. But their analysis tells us little about why such specific features are selected to signify mediation, nor indeed how these signifiers come to earn their place in a particular generic repertory. Georgina Born's (2005, 2011) account of musical mediation adds welcome complexity to this picture. First of all, it demands that we understand the material and the aesthetic as 'mutually mediated', so that neither technological affordance nor musical gesture takes precedence as the source of a particular transformation. Borrowing the term 'quasi-object' from Michel Serres, Born (2007, 225) suggests that music's emergence from a complex of sociomaterial relations does not foreclose on questions of causality, subjecthood or objecthood. Mediation, to cite Richard Grusin's (2015, 129) attempt at redefinition, 'should be understood not as standing between preformed subjects, objects, actants, or entities but as the process, action, or event that generates or provides the conditions for the emergence of subjects and objects, for the individuation of entities within the world'. Born (2012a) goes further, however, in showing that musical mediation is not simply a matter of 'immediate' social and material relations as given in experience; rather, it engages multiple intersecting 'planes' of relation that entangle it in the production of sometimes distant identities, institutions, communities or genres. By this account there is never a question of nailing down what specific material features of the digital have given rise to its familiar social and sonic character. These features have always already been coproduced at the intersection of ongoing cultural and political processes. Given this complexity, what is remarkable is not so much how effective new technologies can be, but rather how stable and reliable their social attachments can become.

Alongside my interest in the becoming political of the digital is a parallel interest in the becoming digital of particular publics. Specifically, the 'digital' public addressed by the 2011 CALQ report mapped onto a longstanding set of conflicts over the aesthetic and social destiny of

electroacoustic music in relation to newer genres outside academia. Electroacousticians in the city had developed an entrenched image of themselves as embattled mavericks, their hard-won authority misunderstood and overlooked by a mainstream concerned more with novelty than with substance. The electroacoustic literature portrayed musicians and artists on the margins of the electroacoustic tradition as empowered more by new digital mediations than by musical ideas (Chadabe 2000; Emmerson 2001). From both sides, the opposition appeared to fulfil the promise that digital technology would gradually transform the field of cultural production into a flat, postmodern utopia. Expressions of this promise begin to appear in the electroacoustic literature around the mid-1990s. The popularisation of the internet, and the concomitant miniaturisation and personalisation of computing technologies, seemed to challenge the hegemony of university studios, and thus set the stage for unprecedented diversification (Ostertag 1996; Cascone 2000; Waters 2000; Haworth 2016). The ideal of a digitally mediated democracy is now one of the main factors cited in the eclipse of electroacoustic music's academic hegemony. But technological progress is far from being a sufficient explanation for the ways these institutions and scenes have been transformed.

Norms of public-making in art music have posed considerable resistance to the kind of diversification imagined by electroacousticians at the turn of the millennium. In Canada, for example, government funding bodies enforce a hard boundary to protect 'non-commercial' production from the pressures of popular competition.[3] Grants and awards are kept at arm's length from political and social influence by delegating the selection process to independent peer-review boards largely made up of past grant-holders. These rules were instituted at the inception of the federal arts council in the 1950s as part of an effort to advance the professionalism of Canadian artists that Jody Berland (2000, 17) attributes to a kind of 'mimetic' nationalism, an attempt to generate models of unified Canadian identity for wider public consumption. The ideal that the artist should want to be free from external constraint is imbricated in the construction of cultural modernity itself. Since Canada is an aggregation of multiple overlapping nations, all of which represent themselves artistically to some extent, this modernist ideal recurs across multiple overlapping jurisdictions (Taylor 1993).

Pierre Bourdieu defined the 'autonomous field' of cultural production as one in which producers address an audience made up for the most part of their own peers rather than any larger lay public. He drew his model from the nineteenth-century French literary avant-garde, in which

‘producers-for-producers’ competed for access to a market in ‘symbolic capital’ (1993, 125) which appears divested of commercial necessity, but actually demands a considerable level of economic privilege from participants. Bourdieu’s classic portrayal seems to relate economic autonomy to the modernist ideal of aesthetic autonomy, that dialectical opposition between the ‘advanced’ artwork and society which Adorno (1973) famously saw as emerging after the ‘liquidation’ of the Romantic tradition. Although these criticisms do align, it is important to remember that Bourdieu was using the notion of autonomy in a more limited and technical sense and not, primarily, arguing about aesthetics. The mixed or ‘heteronomous’ capital Bourdieu ascribes to commercial art requires the support of some useful activity or function. The field structured around autonomous capital relies on the ‘magical operation’ (1998, 22) of economic reversal, embodied in conventions that ‘consecrate … preexisting social difference’ by clearing a space that privileges disinterested and arbitrary judgment.

As many of Bourdieu’s critics have argued, the operations that produce these limits in cultural time and space are not predetermined by some enduring abstract structural hierarchy so much as reiterated over time in dynamic patterns of imitation and opposition (LiPuma 1993; Boltanski and Thévenot 2006; Born 2010). What I aim to show here is that the iterative constitution of the autonomous field also allows a degree of change and negotiation in the ‘exchange rates’ of the different symbolic goods that circulate across it. Thus while the value of interdisciplinary ‘digital’ practices may have risen and the value of academic electroacoustic music may be in decline, neither change significantly destabilises the distinctions and allegiances that elevate the status of a restricted set of elite musical practices. On the contrary, the turn to the digital could index an increasing scarcity of material resources, intensifying divisions among artists rather than alleviating them. In fact, claims that the new genres and new technologies mediate a better social and aesthetic future in Montreal are nearly identical to the modernist tropes previously associated with the old electroacoustic tradition. Instead, I argue, these claims can be thought of as participating in a complex ‘remediation’ of the autonomous field of production. I use the notion of remediation advisedly, keeping in mind Born’s intersectional model and Gershon’s attention to communicational convention. Here it is not simply a matter of the shaping of new media by old media in the sense of Jay Bolter and Richard Grusin’s (2000) original coinage. While institutions may often look to new technologies to remedy the inequalities of the past, they can also shape technological practice so as to sustain the dominant order.

Instead of further naturalising the social and aesthetic associations of digital technologies in terms of their inherent *non-human* materialities, I want to understand how and why musicians and policymakers go about pressing them into preconceived, often idealised *human* ends. A seemingly innocuous set of assertions about the preservation of a minority settler culture in the digital age also provides a point of entry into a broader consideration of the ways that technological change can be abstracted into aesthetic value. Grounded in 16 months of ethnographic fieldwork, my examination takes the form of a series of snapshots that show how, in spite of significant rhetorical transformations, inequalities between genres can persist even after the eclipse of a dominant tradition.

A 'digital culture'

My fieldwork in Montreal began in May 2011 on the day of a highly anticipated federal election, the third in Canada in five years. Its results were portrayed in the media as marking a new stage in Canadian democracy. First, voters in Ontario, the country's economic core, shifted away from the previously dominant Liberal party to construct the first Conservative majority in 20 years after a long string of ineffectual minority governments. Second, voters in Quebec shifted to the left-leaning federalist New Democratic Party (NDP), leading to the defeat of all but three members of the Bloc Québécois, the separatist protest party which had held nearly every federal seat in the province since 1993. As a result, the NDP became the official opposition party. Analysis in the press dubbed this Canada's first 'social media election', citing the influence of the *vague orange* ('orange wave', after the colour of the NDP logo) campaigns which ignited Quebecois Facebook and Twitter traffic in the weeks before the vote. Divergent narratives emerged almost immediately to explain this shocking change in the fortune of a party which had never held more than one seat in Quebec since it first posted candidates in 1962. Anglophone media reported the swing as signalling a drop in support for political separation and a new era of harmonious federal cooperation. In the francophone press, however, the turn seemed to indicate renewed isolation from the rest of the country. The NDP held 75 – slightly more than a quarter – of the seats in the House of Commons: Quebec's population had thrown its considerable federal influence behind a left-wing political orientation which the rest of the country seemed not to want to share. Complaints began to emerge from separatist quarters that the NDP had defrauded Quebecois voters to lure them away from their

'natural' support for the independence movement. It began to emerge that some of the NDP candidates had no serious connection with the province: they had never visited their ridings, and a few could not even speak French.

Campaign advertisements for the defeated Bloc Québécois lingered on the walls of Montreal's metro system in the weeks following my arrival. One depicted a track of stage lighting suspended above a vacant proscenium illuminating the curt slogan '*Parlons culture'* – a phrase signifying something between the English 'we speak culture' (as in: 'culture is our language') and the more imperative 'let's talk culture'. Like the Bloc's main campaign slogan that year, *Parlons QC*, these posters capitalised on the strong connection between language and place which characterises dominant constructions of Quebecois identity. Here, however, the word 'culture' also gestured towards a connection between identity and the arts. This double meaning has served both separatist and counter-separatist purposes throughout Quebec's political history (Handler 1988, 102-10). The political scientist Diane Saint-Pierre (2003) situates its roots in the 'humanist' (*anthropologique*) thinking that drove cold war efforts to establish a discourse of 'cultural rights'.[4] Policy discourse during the emergence of the separatist movement in the 1960s deployed the concept of culture to signify both sovereign control over cultural *resources* and provision for cultural *needs*.

It was in this spirit that the separatist sociologist Fernand Dumont (1993) proposed a definition of culture with two layers. 'First culture' for Dumont was the common-sense body of practices, meanings, ideals and models, akin to Bourdieu's (1977) *habitus*. First culture is that which is always already present for individuals depending on where they were born. This layer of culture delineates the practices and objects included in Quebecois constructions of cultural rights and needs. It is this notion of culture to which Quebecois politicians refer when they speak of the immigrant populations that they host as minorities as *communautés culturelles* (cultural communities) (Handler, 158). Dumont's 'second culture' is the acquired, ideological and historical consciousness that comes about through cultivation and education, including the arts. Accordingly, Quebecois nationalism places a high premium on the arts as an economic and social resource.[5]

Culture is thus not simply a background against which musical production takes form. Debates around what culture is are central to the public life of cultural producers and consumers. Quebec's aspirational status as an independent nation is deeply invested in both the first culture associated with language and place and the second culture expressed in

artistic pursuits. In the past, this relationship was treated as primarily mimetic. 'Since the political realm cannot offer its own proofs of the nation's reality', writes literary scholar Erin Hurley (2011, 22), 'the fictions of cultural production frequently bear the burden of proving le fait national'. Literary, musical and theatrical avant-gardes in the 1960s and 70s sought to reflect the everyday life of the rural population. But genre, language and identity-bending spectacles such as those of Cirque du Soleil, Ex Machina and Carbone 14 have become increasingly emblematic of Quebecois creativity. Perhaps disillusioned by the waning of separatist sentiment, or perhaps in response to the proliferation of hybrid Quebecois identities as the population becomes more ethnically mixed, these new cultural representatives portray a kind of cosmopolitan ambivalence towards markers of origin. This plays into a popular essentialism contrasting the 'gestural' and 'emotional' character of francophone performance to the 'textual' and 'rational' focus of anglophone productions (Hurley 2011, 14–15). In practice, however, performances of Quebecois identity are difficult to divide along essentialised ethnic lines.

The complication is particularly salient in Montreal. The patterns of translation which characterise everyday life in the city coalesce into a range of multilingual identities, expressions shaped by the gaps between languages and cultures (Simon 1994; Probyn 1996). Disguised and misread markers of identity render the city's linguistic and cultural character notoriously difficult for outsiders to decipher (Straw 2008). Its disparate traditions of acousmatic music, disco, prog rock and intermedia theatre have all made use of such complications of identity. In many ways, the complexity of mixture in Montreal, more than non-anglophone identity *per se*, is what makes culture there stand out as an issue (Boudreault-Fournier and Blais 2016).

The city's reputation as a place where culture is a local speciality transcends local discourse. The independent rock scene of the mid-2000s, for example, was widely mythologised as a kind of perfect storm generated by the constant migration of anglophone students from other parts of the continent (Stahl 2001). Many were attracted to Montreal universities in the late 1990s by low tuition rates, cheap property values due to the slow recovery of the real-estate market following the second sovereignty referendum, and strict tenant protection laws instituted by the first separatist provincial government in the 1970s.[6] The conditions benefited not only bands, but brands like Vice Magazine and American Apparel, both of which rose from Montreal's student ghettos to define global hipsterdom. The visual representations associated with these scenes paint

a conspicuously displaced picture of Quebecois pride. Arguably the most popular and enduring band to emerge from the post-referendum independent rock scene was Arcade Fire, a group which draws most of its members from outside the city and releases its work with American independent labels. The band promoted its 2012 tour with a t-shirt featuring a stylised map of the province and the English-language warning riffing on a popular slogan for Texan tourism: 'Don't mess with Quebec!' The scene's annual point of convergence is a festival established in the late 1990s known as Pop Montreal. A variation on the 'buy local' poster hung on the lamp posts on busy Saint Laurent Boulevard during the 2011 and 2012 editions of the festival encouraged shoppers to weigh the value of goods *made icitte vs. made ailleurs*. The expression defies translation because, like many local idioms, it combines two languages. It playfully thwarts Quebec's notorious laws restricting the linguistic content of all signage to French, and succinctly encapsulates a salient local linguistic idiosyncrasy. The identity it signifies is perhaps best described as 'post-national' (Heller 2011).

Historical narratives play an important role in reining in this kind of cross-cultural promiscuity. The period known as the *Révolution tranquille* or Quiet Revolution is particularly effective in this regard. Accounts both inside and outside Quebec figure this time, situated roughly between the death of the ultra-conservative premier Maurice Duplessis in 1959 and the first sovereignty referendum in 1980, as one of national rebirth and self-actualisation following the suppression of the francophone majority by a Catholic clerical orthodoxy and an Anglo-Canadian business elite (Dickinson and Young 2008, 305–6). New political aspirations arose among a rapidly urbanising francophone population experiencing unprecedented economic empowerment (Jacobs 1981). Mainstream politicians downplayed problematic notions of ethnic particularity and revolutionary struggle, however, to construct a broader programme of modernisation that led to sharp drops in church attendance, widespread educational reform and the Keynesian nationalisation of energy and financial infrastructure (Létourneau 2006; Mills 2010). Harnessing technological progress for the public good became a central component of nation-building strategy (Taylor 1993, 51; Hurley 2011, 20–1). These efforts reached a symbolic peak in the massive urban redevelopment projects undertaken as Montreal prepared to host the World's Fair in the summer of 1967 and the Summer Olympics in 1976 (Kenneally and Sloan 2010). Traces of these events are still etched deep into the face of Montreal's urban core. Over the course of 20 years, the city sprouted an arts complex modelled on Lincoln Centre, an imposing crop of modernist

skyscrapers, an ostentatious network of high-flying concrete traffic interchanges, an artificial island, a colourful underground transit system and two new university complexes (Illien 1999; Germain and Rose 2000). The period is central to Montreal's reputation as a site of cultural dominance and as an icon of technological advance in Canada. Present-day cultural sentiment has been deeply affected by this weaving together of modernist technological projects and humanist notions of ethnic and linguistic empowerment.

The 'creative cities' strategies advocated since the turn of the millennium by local lobby groups have intensified this connection, increasingly calling upon technoculture as an instrument of economic growth. The Quartier des Spectacles development initiated in 2002 set the tone, transforming Montreal's former red-light district into a permanent multimedia festival space (McKim 2012). In the language of provincial bureaucrats inspired by global creative-economy policies, such convergence between cultural institutions and business would facilitate 'transfers of expertise' and help artists secure access to specialised infrastructure. Business lobby groups called upon 'creatives' to become more involved in the local tourist industry (Brault 2009). Meanwhile, the culture ministry refocused arts funding on the provision of 'added value' by replacing some project funds with grants to stimulate corporate arts patronage (Doyon 2013). Transnational policy trends aligned with and intensified the homegrown mythos of untapped vitality and diversity. Echoing transformations in cities around the world, post-Fordist gentrification advocates deployed artists and musicians as spokespeople for a more prosperous future (Harvey 2005; Krims 2007).

When professional consultations for the CALQ's new digital arts initiatives began in the late spring of 2011, the province had already begun to prepare for the fiftieth anniversary of the 1967 World's Fair. Combined with the renewed feelings of cultural solidarity that followed the election results, plans for commemorations of the Quiet Revolution lent the meetings a strong sense of collective purpose. Rumours circulated about who would receive major commissions for the culminating celebratory events in 2017. Ten smaller meetings were held, each addressed to one of the disciplines the council supported with its existing funding instruments. The largest meeting heard three days of interventions from the literary sector. The second largest addressed the clientele for the proposed digital art programmes. The bulk of the invitations to the two-day gathering went to prominent intermediaries and previous grant-holders in Montreal. Musicians, sound artists and music promoters made up a considerable part of the digital-art guest list,

in spite of the fact that a meeting specifically for musicians had already taken place. The music consultation had focused on traditional instrumental and vocal genres, while the digital art forum attracted musicians working in experimental and interdisciplinary settings. Delegates received a point form agenda a few days in advance informing them that the committee sought proposals to enhance the 'viability' of the field in five domains: creation, production, diffusion, promotion and advanced training. Nevertheless, concerns on the day gravitated repeatedly towards the category framing the discussion. How should the council identify specifically 'digital' productions? What defined this new medium that attracted musicians, visual artists, computer programmers and conceptual artists alike?

For the public servants leading the forum, the answer seemed to lie in a shared heritage of experimentation. The opening presentation revolved around a timeline mapping out the genealogy of the prospective genre. It began with international points of reference like the legendary '9 Evenings' project at Bell Laboratories in 1966 and the foundation of Pierre Boulez's Institut de Recherche et de Coordination Acoustique/ Musique (IRCAM) in Paris in 1977. It continued with a list of starting dates for local artist-run institutions and festivals: the multimedia installation festival and computer animation competition Images du Futur (Images of the Future), curated by Hervé Fischer and Ginette Major every summer between 1985 and 1996; the web-focused multimedia centre Agence TOPO in 1993; the research-orientated SAT (Société des Arts Technologiques) and the feminist Studio XX established in 1996; Perte de Signal and the Fondation Daniel Langlois in 1997; the MUTEK and Elektra festivals, the inter-university art and engineering consortium Hexagram, and the public sound installation *Silophone* built by the local duo The USER in 2000. Delegates were encouraged to embrace and celebrate this tradition of aesthetic mixture and interdisciplinarity. Together, the committee argued, these institutions had built Montreal into a 'hub for the digital arts', a beacon of creativity and diversity in North America with an international profile comparable to 'a little Berlin', thereby referencing not only the German city's post-reunification success as a hotbed of film, performance and electronic dance-music production, but also specific partnerships with Berlin-based festivals such as Transmediale and its younger sister Club Transmediale (CTM). The surviving architectural icons of Montreal's modernisation attested to the durability and continuity of the tradition. In this regard, convenors suggested, digital mediation was only the most recent twist in a 'rhizomatic' network of progressive technological innovation.[7]

But there was little agreement when it came to defining the new discipline in strictly technological terms. Whenever the floor opened to commentary, delegates consistently cast aside any attempt to ground the genre in material or conceptual terms. Theoretical efforts to ground the scene in notions like 'digital material', 'code' or 'feedback' found only limited support. The prominent sound art curator Eric Mattson, known for his work showcasing experimental musicians at the annual MUTEK festival, stood several times to express his doubt that the council could ever actually distinguish an essentially digital quality or style. Where, he asked, would this leave producers working in analogue or mechanical media? Would digital art committees simply ignore more conceptual practices exploring language or the body? Ideological unity was nowhere to be found. Pockets of dissent boiled over during breaks around the dominance of middle-aged male voices in the meetings and the lack of effort to make funding accessible to women and indigenous populations. An open letter of complaint prepared by a group of open-source software and hardware activists was roundly rejected (Koumbit 2011). Conversation quickly returned to safer matters like infrastructural support, international distribution networks and peer review practices.

And so, culture emerged again as the explanation for the scene's cohesion. The director of the Elektra festival, Alain Thibault, argued the case. Accepting that a degree of mutual recognition had already obtained among key players, the question now was one of keeping up with the 'perpetual evolution' of technology. What was at stake, Thibault suggested, was not a sedimented tradition so much as an overarching 'digital culture' in continuous mutation. Instead of particular subcultures distinguishable by their computational preoccupations, Thibault's diagnosis deployed the digital as a kind of 'master sign' for the destabilising force of late modernity itself: an index of speed, interchangeability and fluidity (Rabinovitz and Geil 2004, 4–5). He also echoed the separatist trope of modernity as the end point of a passage from childhood to adulthood, the teleological inclination of a self-actualising, independent political body (Handler, 140–58; cf. Lamoureux 2011). In this view, a diversity of expressions was not a challenge to be overcome but a positive feature of digital progress. Harnessing the digital as a dynamic cultural resource was the best way to empower Quebecois artists on the world stage.

Local academic electroacoustic studios were conspicuously absent from the construction of futurity offered at these consultations, and the subtext of Thibault's intervention suggests an explanation. His invocation of digital culture echoed a paper he had published in the local new music

journal *Circuit* in 2002 expressing the reasons for his own break with electroacoustic tradition (Thibault 2002, 51–6). Thibault's initiation into electroacoustic music had taken place at the fledgling Studio de Musique Électronique de l'Université Laval (SMEUL) in the mid-1970s, where he studied with one of the first teachers of acousmatic music in the province, the GRM-educated multimedia composer Marcelle Deschênes (Mountain 2003; Lefebvre 2009). In 1980, when Deschênes went on to become the founding author of the electroacoustic curriculum at the Université de Montréal, Thibault followed her to join the first cohort of postgraduate students. He learnt by assisting her with her ambitious intermedia operas and soon garnered a reputation as an unrepentant heretic himself. His early compositions, such as *OUT* (1985) and *Volt* (1987), used piano-roll sequencing software to construct dark, new wave-inspired sound palettes, complete with driving drum-machine patterns and sampled vocals plundered from radio and television broadcasts.

In 1993, he became director of the electroacoustic concert society ACREQ (Association pour la création et la recherche électroacoustique du Québec), of which Deschênes had been among the cofounders in 1978. Before his arrival, the directorship of ACREQ had changed hands every couple of years, but Thibault transformed the institution into a personal outlet and remained in permanent control. Over the ensuing decade, he gradually increased the distance between the organisation and the electroacoustic studios, first focusing activities on his own productions and then expanding outwards with the first Elektra festival in 1999. Written at the culmination of ACREQ's new identity, his *Circuit* article reads as a defiant manifesto. In it he imagined digital culture as a counterpoint to academic mediocrity, a tuning-in to changing demands generated outside the canon. He called for a renewed openness to the technical and stylistic fluidity of electronic dance musics, praising the direct concatenation these genres seemed to make between machine, rhythm and body. Digital culture was much more than a response to new technological conditions. It stood for all the sounds and materialities that the electroacoustic tradition seemed to have left out.

The following summer saw the launch of ACREQ's *Biennale Internationale d'Art Numérique* (BIAN), expanding the Elektra festival's remit into a showcase for digital culture across the city. In an interview with me several months later, ACREQ's assistant director Nathalie Bachand described the development strategy to me as one of 'infection': in the years leading up to BIAN she had taken positions on the boards of other local institutions in an effort to align them with ACREQ's vision.[8] In 2011, however, most of the sound artists and composers with whom I

spoke still expressed frustration with ACREQ's dominance. There was a conspicuous mismatch between Thibault's revolt against the electroacoustic tradition, on the one hand, and his festival's consistently highbrow programming, on the other. High-intensity, abstract, monochromatic audiovisual spectacles – typified by immersive showstoppers like Austrian artist Kurt Hentschläger's 2006 fog, strobe light and subwoofer piece 'Feed', which featured on Elektra's programme no less than four years in a row between 2007 and 2011 – had become the festival's mainstay. As a representative of the MUTEK festival put it to me, in spite of the occasional inclusion of techno producers in its programmes, Elektra was clearly 'for the head' and not 'for the feet'. Cinema seats and gallery installations prevailed over dance floors. There was also a heavy focus on the festival's international profile, to the extent that I heard several artists complain that ACREQ had fallen out of touch with local sounds. Programming rarely diverged between Elektra and the Québec Numérique events that ACREQ organised regularly in Paris. The same small group of international artists reappeared year after year. Instead of uniting the scene around a common cause, the spectre of a 'digital culture' gave programmers an alibi that excused them from accounting for frictions and inequalities. An imaginary, essentially digital plurality provided far more flexibility and prestige than the complex and contentious plurality of local aesthetic traditions and specific technological affordances.

'Robust, but invisible'

The academic electroacoustic scene had already begun to adjust itself to the new order. The long-running acousmatic concert series *Rien à voir*, established in the early 1990s by three disciples of the French composer Francis Dhomont, had recently rebranded itself as Akousma, a festival of 'immersive digital musics'. Montreal's two largest electroacoustic research studios, at McGill and the Université de Montréal, were in the process of rebranding their own programmes around terms such as 'digital music' and 'digital composition'. Decidedly minor in comparison, the smaller, practically orientated electroacoustics offering at Concordia University was busy catching up as well. And the changes it was undergoing were closely connected with the advance of digital culture policies.

Since it is not as strongly attached to conventional conservatory training or scientific research, Concordia has a relatively dynamic relationship with notions of discipline, and thus its stake in aesthetic and

technological progress is quite high. In a paradoxical way, it is both among the oldest and the newest electroacoustic composition programmes in the city. The first undergraduate major in electroacoustics was awarded only in 2005, but the courses at its core were first offered in 1970. Concordia itself came into being only in 1974, through a forced amalgamation between the adult education institution Sir George Williams University, administered by the Young Men's Christian Association (YMCA), and the anglophone Catholic seminary Loyola College, as part of the sweeping secularisation and democratisation reforms initiated by a Quiet Revolution public commission on the Quebec education system (Corbo 2002; Lenoir 2005). The YMCA's focus on applied and adult education has survived the merger to this day, and Concordia continues to cultivate a more pragmatic and flexible image than its more famous neighbours. Music teaching at Concordia falls under the authority of the Faculty of Fine Arts. Students can study for undergraduate degrees in classical performance, jazz performance, composition or electroacoustics. The department emphasises pedagogy over research: no standardised postgraduate degrees are available. For some time, however, the electroacoustics area at Concordia did play an important role in organising and representing electroacoustic researchers at a national level. Between 1986 and 2008 it hosted the Canadian Electroacoustic Community (CEC), a national professional society complete with its own open-access journal, an annual conference and a substantial archive of historical recordings (Mountain 2001). It also maintained an international mailing list for electroacoustic composers and organised an annual student competition. Lately, however, attention and resources had begun to shift.

In 2001 the university had secured the first wave of funding for a major new art and engineering research consortium known as Hexagram. The project was among the first in the arts to receive support from the Canadian Foundation for Innovation (CFI), a federal body for engineering and infrastructure development founded in 1997. Hexagram's mandate was to foster interdisciplinary collaboration between media artists, academic research and the local multimedia industry. For nearly a decade the consortium operated as an independent research board with partners at both Concordia and UQAM. Activities were coordinated by a full-time team of administrators.[9] Then, in 2008, following disputes over mismanagement, this centralised structure was dissolved and each university took full control over its share of the partnership.

The original CFI grant covered the provision of new studios, laboratories and digital design workshops with interests cutting across the various disciplines at the universities and other local institutions.

Several Hexagram researchers had strong ties with ACREQ and the SAT, for example, so strong connections developed with the emerging digital arts scene. Electroacoustics at Concordia remained at a distance from the new studios, despite the fact that one of its most active researchers, the composer and musicologist Rosemary Mountain, had helped to write the original grant application. In part, this was because the new technical and performance standards at Hexagram seemed to undermine the authority of long-established electroacoustic practice. Convergence only began in earnest in 2011 after the former Hexagram administrator Ricardo Dal Farra had been moved into the department as interim chair. When I arrived, staff were in the process of adapting to new facilities after moving from a relatively remote suburban campus to a new plate-glass office building shared with the School of Business. The art and technology complex housing the Hexagram consortium, which had once been a half-hour bus ride away, was now reachable in ten minutes through a tunnel connected to the university's metro station. On one hand, this afforded electroacousticians access to new interdisciplinary collaborations. On the other, it diminished their responsibility over classrooms, studios and equipment. Scheduling and spatial decisions which had once been handled more or less informally now underwent intense administrative oversight. Instead of using equipment internal to the department, instructors were now forced to draw from an interdepartmental pool of resources in which provision for discipline-specific habits and conventions came second to the faculty-wide standard. On a material and spatial level, then, interdisciplinarity went hand in hand with a loss of heterogeneity.

The bulk of the resistance to Hexagram's nascent hegemony came from the founder of electroacoustics at Concordia, Kevin Austin. He had begun teaching in the music department while still studying as an undergraduate at the pioneering McGill studio in the early 1970s and was instrumental in the genesis of the city's electroacoustic scene. He remained generally popular with students. Alumni included members of Arcade Fire, whose international success Austin proudly attributed to their rigorous electroacoustic training: this was a pedigree that, for Austin, connected them with the excellence of the international avant-garde. Austin himself had trained with the Hungarian-born composer István Anhalt on equipment designed by the pioneering Canadian physicist and instrument-builder Hugh Le Caine. The McGill studio's idiosyncratic oscillator banks, variable-speed tape machine and sequencer-like SSSG (Serial Sound Structure Generator) all came from Le Caine's workshop at the National Research Council in Ottawa (Young 1991). Austin was such an expert on the Le Caine equipment that he remained at McGill as de facto technical assistant

for several years after the Argentinian composer Alcides Lanza took over direction of the studio in 1971 (Lanza 1980). Although Austin arrived at Concordia with no teaching experience, the more pragmatic department afforded him the space to elaborate upon and systematise the approaches he had learnt under Anhalt. Working primarily with untrained musicians in a department without a composition stream, he could set assignments informed less by traditional music theory than by the cybernetics and phonetics research which had inspired the first wave of European electroacousticians (Grant 2001). His teaching still preserved the naturalism of the cold war avant-garde, conflating synthesis technique with an ideology of unmediated, objective auditory awareness (Piekut 2012).

By the time Austin had settled into a permanent position at Concordia in the early 1980s, the courses he offered there were already surpassed by the better-funded studio research being conducted at McGill and the Université de Montréal. Similar programmes had also taken off at universities in Toronto, Kingston and Vancouver (Guérin 1992, 410). Having limited opportunities to expand his course, Austin channelled his energy into remote connections. The idea of creating a national network came to him around 1982 or 1983, he told me. After the university awarded him a small technology grant to buy modems for the department's small collection of Apple II personal computers, he established his email list. This, he claimed, was the fulfilment of a promise inherent in the technology he had worked with as a student. 'This was the beginning of the technology that was going to allow the evolution that I had been waiting for 12 years previously.'[10] The idea of a national electroacoustic society arose from the galvanising Wired Society conference at The Music Gallery in Toronto in 1986. The Canadian League of Composers (CLC) had traditionally rejected composers who worked only in electroacoustics, so the CEC would provide a kind of alternative union for those marginalised by the instrumental tradition. For Austin, steeped in the new telecommunications media, there was a more radical ontological distinction to be made as well. The bond between the members was not to be based on shared aesthetics – this would invite the same kind of exclusions that electroacousticians had experienced under the CLC. The way to avoid this, Austin believed, was to define the CEC in communicational terms:

> The word 'music' doesn't appear on the CEC website. It was designed to look at the nature of the technology and understand human communication in information theoretical terms. You have a source, a channel and a receiver, and this can be broken down into multiple

> sources, channels and receivers … and the 'electroacoustics' is part of this chain that connects the ideas of this person to the cognition of this person. The idea is to make this part of the chain robust, but invisible.[11]

Present-day undergraduates at Concordia still learnt according to this principle. In the eyes of the teaching staff, the constraints an electroacoustician faced were not determined by genre, but inscribed into the communication process. Residual aesthetic biases returned, however, whenever questions of repertory arose. One example of this return came in the required electroacoustic history course 'From Edison to iPod'. At the time of my fieldwork the course was being taught by a young instructor in the final years of a PhD in music education. Responding to questions about the curriculum following one of my first visits to the department, he showed me the chronological listening syllabus he had prepared for the course. It began with the birth of modern sound recording and proceeded by profiling the pioneering studios of the 1950s and 1960s. The challenge, he explained, was to find representative material for the last period, from 1980 to the present: there seemed to be few compositions of enough critical importance to merit inclusion. He laughed uncomfortably over the fact that the last few selections had been composed more than a decade *before* the invention of the iPod.

According to Austin, the task of sustaining tradition was difficult because the influence of pioneers like Anhalt and Le Caine had simply become too diverse and too fragmented to perceive. So long as the technological means of communication advanced, its democratisation would increase. He advanced this theory at every opportunity. In an impromptu speech during the intermission of a concert on the twenty-fifth anniversary of the CEC in November 2011, for example, Austin danced among the assembled students and guests miming the growth of the organisation as if it were a miniature city. Electroacoustics, he explained, had never been an exclusive club; it was a 'community', inclusive even of musicians who did not necessarily see themselves as members, regardless of genre or style. 'We speak for everybody who uses loudspeakers to make sound', he declared magnanimously. In the beginning, the growth of the community had been vertical, but now it was increasingly flat and horizontal. Practices that had accumulated on the fringes, like 'live electroacoustics' and 'turntablism', would one day overcome the centre. 'There's a kid with an iPad who's eight years old now will have ten years of experience when she enters the programme', Austin speculated. 'I don't want to have to teach that kid!'

But there was a certain affective friction between Austin's embrace of an expanding economy of practices and his desire to link it to a single chain of historical events. If the ideal was to keep the connections across the electroacoustic community 'robust but invisible', then there should be as little intervention as possible. But if connections continued to proliferate without intervention, then the community might lose sight of its unified basis in communication technology. Effectively, technological progress had condemned the electroacoustic tradition to usher in its own downfall. With few exceptions, the students to whom I spoke at Concordia dismissed their instructors' respect for the historical avant-garde as so much conservatism. Even those who embraced the electroacoustic tradition tended to wrap their attachment in self-deprecating humour. The current CEC president arrived at the anniversary concert sporting a T-shirt bearing the ironic slogan 'Sex, Drugs, and Academic Electroacoustic Music', which had been given out at a conference in Mexico City the previous summer. I complimented him on the joke, and a former student standing within earshot admitted to having the same shirt. This was a student who was now pursuing an interdisciplinary degree at Hexagram and had been rather critical of the electroacoustic tradition in interview. It seemed that both its supporters and its detractors could share the ironic sentiment engendered by its decline.

The work of the maverick feels futile when it reaches the critical point at which synthesis with the mainstream is no longer avoidable. Recalling to me how harshly the national composers' unions had once rejected electroacousticians, Austin compared the bitterness of the marginalised CEC to that of the Greek-tragedy figure Electra. For Austin, Electra seemed to represent the electroacoustician's desperation at being denied access to the art-music world. Betrayed and banished by her own mother, Electra recognises herself as the rightful heir to the throne, but is incapable of taking revenge without thereby bringing misfortune upon herself (Euripides 1963). The metaphor was shot through with ironies. Not only was this a remarkably feminised character for a community in which women had struggled so long for access,[12] it was the same character that Thibault had used to name his decidedly *anti-electroacoustic* festival. Both seemed to want to inherit the prestige of the avant-garde tradition (their metaphorical mother) by destroying or surpassing it with the help of 'the digital', but to do so would make the kind of prestige they sought impossible. For Austin, however, the sentiment of defiance and exile was far more real. The true extent of the electroacoustic tradition's bitterness was evident only now that it had lost its grip on its own rebellion.

'Tainted blood'

In the weeks following my semester at Concordia I met with the CEC's cofounder, a former student of Austin's named Jean-François Denis. Denis left his academic career behind in the late 1980s to found the label empreintes DIGITALes in partnership with the Ottawa-born composer Claude Schryer. The goal of their collaboration was to issue high-quality electroacoustic music on the latest digital formats: first CD, later multichannel audio DVD, and in the future, Denis promised me, the highest definition multichannel streaming format. Instead of the multicomposer programming common in classical recordings, however, each disc would profile an individual, not unlike a rock album. The name of the label indexed these defining features through a bilingual play on the French term for 'fingerprint'. Although still operating from a residential apartment in the city's eastern Plateau neighbourhood, the label had a global reputation as the definitive arbiter of the acousmatic sound, with a particular emphasis on composers from Canada and the United Kingdom.

Given such self-consciously digital branding, I thought to ask Denis if he could think of anyone in Montreal whose work had a characteristically digital aesthetic. At first, true to acousmatic principles, he protested. Electroacoustic music is a music 'made of sounds', he told me: one intends a certain sonic quality and attempts to realise it with whatever equipment is at hand (cf. Schaeffer 1966). If a composer is influenced by the equipment, their work is concerned with something other than sound. He offered the example of Jean Piché, who composes in a multimedia genre he calls *vidéomusique*. Then, at my insistence, Denis took a scrap of paper from his desk and sketched out a timeline of the local field. Alongside the foundation of key festivals and institutions, he pinpointed instruments that had transformed some aspect of production or consumption. A cluster of reference points seemed to emerge around 1990: his own label, the Akai S1000 sampler, the Alesis ADAT digital tape format. But the most important event of this period was a festival Piché himself had curated, the penultimate edition of a touring showcase of 'downtown' composers known as New Music America (NMA) (Brooks 1992). NMA created a 'new dynamic in Montreal', Denis claimed. For the first time, a festival encompassed the whole gamut of contemporary sounds. No one could have ignored Piché's impact.

Piché had his first training in electroacoustic music in the mid-1970s at the Université Laval, where he worked in the same studio as Deschênes

and Thibault. He then left Quebec to study at Simon Fraser University (SFU) in Vancouver with the cofounder of the acoustic ecology movement, Barry Truax.[13] It was there that Piché began using a digital computer to program his compositions. After short periods at Stanford University in California and the Institute of Sonology in Utrecht, Piché continued to make his home in Vancouver for several years. He started a family there and found work producing commercial music and jingles at Mushroom Studios, a popular recording site among west-coast rock bands. He soon left behind the mainframe programming of the academic studios when he became one of the first private musicians in Canada to buy a Fairlight CMI, the Australian standalone sampling and sequencing system popularised by Peter Gabriel and Kate Bush.[14] Around the same time, Piché's former colleagues Deschênes and Thibault also adopted the Fairlight, at the Université de Montréal. Its pop-orientated sample library and piano-roll sequencing interface gave their music a rhythmic quality which set it apart from the modernist orthodoxy. The hybrid style of works like Deschênes' monumental new-wave inspired *OPÉRAaaaAH!* (1981–3) set a high standard for intermedia production in Canada. Indeed, sequencing-heavy compositions such as these are perhaps the closest one can come to a material point of divergence between electroacoustic music and what later became digital art.

After his stint in Vancouver, Piché moved on to Ottawa, where he worked as a programme officer for the music section of the Canada Council. He made a name for himself there by introducing a new genre category positioned between classical, traditional and popular experimentalisms known in Quebec as *musique actuelle*.[15] The new category opened up channels of support to crossover improvisers and composers with links to jazz and rock. It was thus as a federal policymaker that Piché began to shape Montreal's sound. Genre-bending work that had previously gone unrecognised by the council's peer-review committees would now receive full consideration. And although there were still those at home who were suspicious of his federalism, his success as an intermediary of Quebecois interests in Ottawa earned him new credibility. When the faculty of music at the Université de Montréal announced a new position in electroacoustic music in 1988, Piché joined Deschênes as the studio's second full-time faculty member.

As artistic director of NMA in 1990, Piché would solidify his reputation for pluralism. Subtitled Montréal Musiques Actuelles, the Montreal edition of NMA brought together contemporary Canadian and Quebecois composers and improvisers with rising stars from the American and European downtown scenes. The list of guests would be considered

adventurous even today: it included conceptual composers like La Monte Young and Alvin Curran, feminist pioneers like Joan La Barbara and Hildegard Westerkamp, and rock crossover artists like Rhys Chatham, Einstürzende Neubauten and Brian Eno (Brooks et al. 1991). The American producers behind the annual touring showcase sold it as a celebration of diversity in the face of cloistered academic tradition. In a review published a few months after the festival, Piché echoed their optimism. For him, NMA proved that the 'most important American aesthetic currents' of the day were those flourishing outside the university. The goal of a progressive new music festival should be 'to make co-exist, under the lights of the same stage, every type of musical expression demonstrating a willingness to push back the limits of the language of its choice' (Piché 1990, 138). Piché denounced the 'snobbism' of the 'partisans of hard discipline' among Montreal's critics and musicians. This was a music that could finally speak to audiences on their own terms. 'One of my little satisfactions of the festival', he wrote, 'was a comment from a sympathetic regular of the "punk" bar Foufounes Électriques. For him, *musique actuelle* was even more crazy [*sauté*] than industrial rock!' (Piché 1990, 139).

Piché's confrontation found broad support among Montreal's younger electroacousticians and sound artists. Kathy Kennedy, experimental vocalist and founder of the feminist media art centre Studio XX, declared that 'Montréal's community could never again succumb to academic complacency after the shrieking of choirs and church bells in the streets, the kumungo pluckings through deafening silence at Foufounes Électriques'. An even more provocative response came from the critic George Dupuis, who described Piché's festival as 'less an affront to the FIMAV [the long-running Festival de Musique Actuelle de Victoriaville, which shared Piché's pluralist leanings] than to the historically staid Montréal scene (which, in recent years, seems to have run out of the blood tainted by Boulezian influences)'.[16] This image of 'tainted blood' would have been extremely loaded at the time. In 1991 Canada was still reeling from a massive government scandal in which thousands of haemophiliac patients had been given unscreened transfusions of blood infected with Hepatitis C and Human Immunodeficiency Virus (HIV). The scandal escalated into a public inquiry, which led to a complete overhaul of Canada's blood system (Picard 1995). Thus Dupuis's critique shows how polarised the claims of modernists and postmodernists had become at this pivotal time. Indeed, high-profile dissenters like Jean-Jacques Nattiez (1991) asserted that Piché's pluralism would lead to a complete breakdown of musical value

judgments if left unchecked (Olivier 1991). Cracks had begun to show in the canon and debates around what was to come next had reached their highest pitch.[17]

By 2012, Piché's work had since transcended the vitriol and retained its cross-genre appeal. More orthodox figures like Denis praised his efforts as a vital part of the continuation of Montreal's electroacoustic tradition. During my fieldwork I attended warmly received lectures by him in the music departments at both Concordia and McGill. He continued to describe his work using theoretical concepts borrowed from acousmatic theory. In a 2004 interview about his audiovisual composition *Sieves*, for example, he connected his approach with Michel Chion's (1994) theories of cinematic synchresis. 'I compose with the images the same way I do with the sound material, in the sense that I will distort and process them with varying degrees of recognisability', he explains. 'The complexity of the image is associated with the complexity of the sound' (Steenhuisen 2009, 262). Meanwhile, proponents of digital art like Thibault were attracted to the high-tech quality of his productions, which demanded expensive, cutting-edge rendering and projection equipment. Also audible were the years Piché had spent in a rock studio. He drew inspiration from a mix of American minimalism and favourite British prog bands like Hawkwind and King Crimson. Consonant drones and repetitive percussion patterns, sometimes generated from recordings of instrumental performers, continued to betray his debt to these styles.

At a noise gig in a Villeray art gallery one night in 2012, a musician with whom I was speaking showed me that he had installed Piché's 1980 composition *Rouge* as the ringtone on his smartphone. This musician had dropped out of a Concordia electroacoustic degree for what he described as 'aesthetic reasons', but still felt a close connection with Piché's music on this informal, everyday level. As Bernard Gendron (2002, 18–19) has noted, the 'secondary aesthetic practices' of musicians – their styles of consumption and taste – play an important role in expressing their aspirations. According to Born (2011, 378), we can understand these markers as mediating allegiance with genre as imagined community. But note that electroacoustic music is not the endpoint of the chain of mediations here. On the contrary, I would argue that by using Piché's electroacoustic music as his ringtone, the noise musician was actually performing his solidarity with Piché's *rejection* of the genre.

A look at *Rouge*'s recent history reinforces this interpretation. *Rouge* was the first track on a 1982 LP entitled *Heliograms* which documented the early computer compositions Piché had realised at Stanford and SFU. In early 2011, the album appeared on an anonymous avant-garde MP3

blog called Continuo. It was here that *Heliograms* first rose to the attention of Montreal's loft denizens. Piché found a new champion in the experimental rock musician Roger Tellier-Craig. Tellier-Craig had begun his career as a guitarist and synthesist in post-rock bands like Godspeed You! Black Emperor [*sic*] and Fly Pan Am, but by 2012 his work was at the forefront of an underground 1980s revival inspired in equal parts by Italo disco and the new-age sounds of electronic composers like Vangelis. From this perspective, Piché's prog and minimalism-inspired juvenilia sounded almost prophetic. Soon Tellier-Craig approached Piché to arrange a rerelease of *Heliograms* on vinyl.

Piché welcomed the renewed interest in his early work although, as he told me in interview, he regarded the choice of format as fetishistic and misguided. In his view, the idea of analogue being 'warmer' or more natural than digital was just a kind of marketing myth: the fact was that it had always had lower bandwidth than digital formats. That was why he had turned to the computer in the first place: why should anyone nowadays have to struggle to hear a signal through the noise? So Piché responded with what amounted to his own personal reappropriation. He extracted two sections from the 1982 album, *Rouge* and *Ange*, remastered the audio in a high-definition digital format and joined the two compositions together with a seamless fade. He then set about designing animations to accompany the new arrangement, assembling HD footage from a trip to India and processing it to near-abstraction in Adobe After Effects. This new *vidéomusique* realisation of *Rouge* and *Ange* premièred at the next Elektra festival in early May 2012.

If we follow Tellier-Craig's work from the same period we can discern a further bifurcation. The video for Piché's remastered *Rouge* compares readily, for example, with Sabrina Ratté's video for Tellier-Craig's 2012 track '*Data Daze',* released under their collective pseudonym Le Révélateur. The two works are strikingly similar. Both feature pulsing minimalist-derived algorithmic rhythms and shimmering, string-like synthesiser pads. Both animations are organised around shifting, brightly coloured, quasi-fractal checkerboard patterns. While Piché's video modernises *Rouge* with high-definition effects, however, Ratté's video for *Data Daze produces an* uncanny, pseudo-vintage quality. In effect, *Data Daze* recreates *Rouge* as the rarefied, ghostly discovery it was for the MP3 blogger who set the whole chain in motion. Viewing and listening to the two, side-by-side, it is almost as if the historical sequence of the two tracks were reversed: *Data Daze* looks and sounds like a distant precursor to *Rouge.* Piché's pluralism had given birth to a monster. If the electroacoustic influence could still be heard, it was circulating endlessly across a web of

mediations linking the Stanford computer music studios, the Elektra festival and the noise musician's mobile device.

'Coalescence'

By the summer of 2011 it was clear that the boundaries of electroacoustic music were shifting, but it was not clear who was responsible for defining the motivation for the movement. There was no simple homology between aesthetic, technological and social factors. Generational allegiances seemed to have little role to play. New and old figures alike rushed to articulate alternative accounts of electroacoustic history and aesthetics. Claims to liberalisation and democratisation arose from both sides. Policy makers and power brokers hoped to gather these changes under the unified banner of 'creative' technological progress. But on the ground matters were never quite so simple. The digital seemed to promise both a means of breaking down electroacoustic hegemony and a means of renewal from within.

The debate over which side would carry this progress forward also provided an alibi for dominant figures in the scene who were increasingly being called upon to address more concrete inequalities. This played out most obviously in the gendering of concert and festival programmes. Women's expressions have historically been severely limited in electroacoustic and other art-music scenes, both in Montreal and elsewhere (Rodgers 2010; Born and Devine 2015). Because gender was a matter of open debate, however, it tended to cover up the intersectional matter of racial inequality. Women's absence was in a sense highlighted by their minimal inclusion. The absenting of Black, Asian and Aboriginal artists from the electroacoustic and digital-art scenes in Montreal was almost without exception, and thus rarely rose to attention. Efforts to correct the dynamic behind such exclusions faced a complex battle, because they were not only enshrined in the structures of dominant institutions but also informed the immediate and material construction of performance conventions.

One of the most outspoken critics of social inequality in the scene at the time of my fieldwork was the composer and visual artist Freida Abtan, a former student of both Austin and Piché. In one sense, Abtan was an advocate for the kind of liberal electroacoustic plurality that her teachers espoused in their work. She performed this commitment in her deeply personal audiovisual aesthetic, mixing electronic dance music, industrial, experimental and acousmatic influences. Her career path cut across the

disciplines of computer science, music and the visual arts, and she extended this interdisciplinarity to her generous engagements as a teacher and concert promoter. While many of the feminist interventions in Montreal's electroacoustic and sound-art scenes favoured separate spaces, outside the scene's overwhelmingly straight male mainstream, Abtan had adopted a more conciliatory tactic, struggling to appropriate and pluralise conventionally gendered spaces and positions of authority.[18] This kept her busy, and we crossed paths repeatedly as I conducted my fieldwork. Over the course of my stay she taught computer programming classes for visual artists at Concordia, worked as a software engineer for a handful of Hexagram researchers, volunteered as a conference organiser with the International Computer Music Association, completed her doctorate in computer music and multimedia from an American Ivy League university and organised an informal monthly concert series. Her work was also proudly eclectic, however, and for many of the more partisan players in the city this was reason enough to dismiss her efforts.

In her concert series Abtan sought to set up conditions in which the wide of range of styles and practices circulating in Montreal could meet and coexist. She had encountered a diverse group of friends and colleagues over her many years in Montreal, and this was a chance to bring them together. The venue for these meetings was a small café on the ground floor of a residential building in a rapidly gentrifying former immigrant neighbourhood known as Mile End. The café was called Cagibi – the colloquial word for a small storage room or closet. It cultivated the kind of hip, thrift-store intimacy that appealed to Mile End's growing population of students and culture workers. Spread across two rooms in a ground-floor shop front, the venue was stuffed with vintage furniture and wistful artwork. The kitchen facing east towards Saint Laurent Boulevard served small vegan dishes, drinks and coffee. The room facing Rue Saint Viateur to the north was fitted with a small stage and a battered sound system. Noise from a busy adjacent intersection leaked through large windows lined with dusty house plants. The atmosphere in the back room approached that of a small bar, but the owners had recently received a warning from city inspectors that their alcohol licence permitted them to serve drinks only with food. So the audience was often reserved, discouraged from lingering after the music was finished.

Each of the instalments in Abtan's series had a different name, and my first visit was on a night she had entitled Coalescence. When I arrived hoping to make a recording of the performances she was busy taking admission, so she directed me to introduce myself to the musicians and find out how they were set up. First on the bill was an improvised duo by

local sound artists Émilie Mouchous and Andrea-Jane Cornell, both former students of Concordia's electroacoustics programme. Cornell worked as music director at the McGill student radio station and Mouchous had settled into an administrative job at an independent gallery in the village of Granby, a short drive away on Montreal's south shore. The duo had arranged their gear on a worn-out sofa positioned to the side of the audience. Mouchous played a bulky black Korg MS-10, a popular vintage analogue synthesiser, with a handful of short patch cables poking out of its iconic faceplate. One of the cables extended to a small patch of red and white fabric. Mouchous had quilted the patch with conductive thread and could modulate the synthesiser by folding and stretching it in her hands. Cornell's set-up consisted of a handmade wooden frame with amplified pieces of yarn stretched across it, a couple of guitar effect pedals and an ageing white laptop that ran a sampling patch she had written in the visual programming language Max/MSP. They both patched their instruments into a small mixing board hidden under the sofa, and its output ran through a single monitor speaker they had positioned on the floor by their feet.

The other performers on the bill had assembled their gear on tables at the front of the stage. Four new silver Apple laptops faced the audience, their identical backlit logos glowing brightly. Each was neatly wired to a blinking MIDI controller and high-resolution digital audio interface. Like Mouchous and Cornell, each of the other acts had elected to play through their own separate mixer and sound system. The duo scheduled to play second consisted of the director of Hexagram, Chris Salter, and a visiting collaborator from the Netherlands introduced by the stage name TeZ (Maurizio Martinucci). They had brought a sound system with them from the university downtown, positioning the four speakers on high stands surrounding the audience. The third duo on the bill, the self-proclaimed 'intelligent dance music' group Foil, would use the house system, a pair of multipurpose speakers normally used by rock and folk acts. From the sofa, I overheard Mouchous and Cornell crack jokes about needing a new computer. They were clearly aware of the gendered hierarchy the instrumentation suggested. Their choice of the intimate, almost domestic space of the sofa over the public space of the stage, although definitely aligned with the expectations of their habitual loft audience, seemed here to foreground the gender division even more (Massey 1994). At any rate, the unusual proliferation of speakers and mixers clearly broke the norms of concert amplification. There was no single point of reception for the audio signal. Each act would effectively try to impose the space it wanted.

As the start time approached, a larger than normal audience poured

into the small back room of the café. I recognised several prominent figures: a handful of Hexagram researchers, electroacoustic faculty from a couple of the university studios, a small contingent of regulars from the loft scene. Notable figures from ACREQ and Hexagram sat at the back with a small entourage. True to Abtan's goal of setting up a meeting point for contrasting genres, these were publics not accustomed to sharing tastes. But their coalescence into one audience would prove difficult. Listeners sat chatting and waiting for the first performance as the scheduled start time passed. There was finally a flurry of negotiations at the back of the room. Abtan had originally scheduled Mouchous and Cornell to play first. Salter and TeZ complained that their guests were in a rush and would not be able to stay. Finally, Abtan conceded that they could open the programme instead.

The performances that followed dramatised the groups' technological and social differences. Salter and TeZ featured complex spatialisation techniques more appropriate to the carefully treated acoustic of a Hexagram laboratory than to a noisy bohemian café. They sat behind their laptops and barely moved over the course of their half-hour set. Their sound palette was subdued, textural and abstract, suggesting the stark machinic worlds of glitch or ambient techno. If perhaps somewhat monotonous, the music was also highly polished. It began almost inaudibly. Twittering, scratching loops spun seamlessly around the four-speaker sound system in accumulating layers, sometimes developing into rhythmic patterns with the help of thumping suboscillator beats before fading away. For 20 minutes, they built the layers into a long, full-spectrum drone, which then dropped abruptly into dramatic silence. After the applause, Salter and TeZ quickly packed away their speaker system and left, conspicuously taking their high-profile audience with them.

Mouchous and Cornell's performance sounded like a deliberate countermovement to the first. Their set-up was heterogeneous, tending towards the tactile and performative. They played from what they jokingly told me were their 'graphic scores' for the evening – triangular sheets of pink paper drawn up by a comic-book artist who owned the art and antique shop next door. Their improvisation proceeded through a series of jagged timbral tableaux. As they began, Cornell scraped together a pair of ceramic saucers accompanied by the delicate whining and squelching of Mouchous's MS-10. The synthesiser part developed into a long textural solo, first over a quietly skipping loop recorded from Cornell's plucked strings, later over a field recording of frogs and crickets. The combination of textures cultivated an almost pastoral mood. After

only half an hour, it drew to a close with a soft, low-frequency drone pulsating under a layer of surreal backwards scraping noises from the computer. Again, the applause was followed by an unmistakeable audience exodus. Only a few people stayed to hear Foil push the café's sound system as hard as they could, posing and rocking behind their laptops. Repelled either by the volume or the style – it was impossible to tell for certain – the audience shrank ever further.

There is no simple way to interpret the frictions produced by Abtan's attempt to foster a new electroacoustic plurality that night. Perhaps her guests' failure to rise above the professional hierarchies and entrenched gender imbalances left a dissonant note in what should otherwise have been a harmonious mixture of sonic practices. Perhaps Abtan's curatorial vision pushed the ideology of digitally engendered diversity too far, and the conjunction was simply not strong enough to support such stark aesthetic dissension. Yet another interpretation might focus on the technological differences between the various genres in play. Perhaps the fragmentation came about because each act expected, and tried to reconstruct, a mutually incompatible set of infrastructural conditions in their performance.

I want to hold on to all three of these interpretations. What is clear is that matters of professional, aesthetic and technological distinction still flowed through social and institutional channels that increased the concentration of symbolic capital among the most powerful. While the relative value of certain practices and aesthetics may have changed, the power structures musicians must negotiate to rise in the ranks still presumed a certain embrace of the 'serious' disposition. In this sense, discourses of organic creativity and plurality simply added a flourish of Bourdieuian bad faith (Jenkins 2002, 158). Competition over symbolic capital continued, and all the better if the competitors believed they had chosen it freely.

Conclusion

Bourdieu's reproductive framework has been rightly criticised for defusing performative subversions of the prevailing order and thus potentially reinforcing the unequal distribution of power it purports to unmask (Rancière 2004; Pelletier 2009). A variety of new digital practices, not all of them exclusively digital in a technical sense, have indeed been put forward for their potential to reconfigure the modernist hierarchies that structure the electroacoustic canon.[19] In the digitisation

of Montreal's electroacoustic scene, however, what was at stake was not necessarily a set of organic subversions from below. Musicians and artists had been heavily incentivised from above to compete among themselves, and were now forced to do so for smaller and smaller portions of concentrated state support. Digital media may have afforded cheaper production and distribution of musical commodities (Morris 2010), but they provided no guarantee of progression in the cultural hierarchy such institutions depend upon for legitimacy. Funding remained concentrated in the most prestigious practices, which had now converged with the most potentially lucrative areas of research and production. In many cases, then, the decline of old aesthetic orthodoxies indexed little more than the degree to which neoliberal capitalism had infiltrated electroacoustic practice. Like the excesses of Burning Man for the tech workers of Silicon Valley (Turner 2009), the rise of interdisciplinary digital art festivals in Montreal gave unity to the social and economic vision of the local technology industry and its political supporters.

It is, of course, crucial to keep sight of the local differences that can shape individual experiences of epoch-defining concepts like neoliberalism and post-Fordism (Hesmondhalgh 1996; Tausig 2014). As Gershon (2011, 546–7) has argued, however, a critical anthropology of neoliberal formations cannot stop at localism, but must also stress the contradictions in scale, power and morality that structure neoliberalism itself. This is what I have tried to show by highlighting the intersection of neoliberalism with an existing modernist ethos of cultural distinction. The efforts of formations like ACREQ and Hexagram had to a degree diversified the aesthetic options within the space of Montreal's electroacoustic tradition. And neoliberal policy encourages us to think of these transformations as the beneficial result of a successful harnessing of new technologies. But such transformations do not erase the institutionalised inequalities that govern access to positions of power, nor are they ever reducible to the autonomous influence of technology.

In Markus Krajewski's (2011) history of the index card, he suggests that there may still be value in Claude Shannon's classic definition of the theory of communication as a study of signals travelling from sender to receiver across a noisy channel. The place of 'mediation' in this model is to assist engineers in managing the noise that disrupts the signal as it travels. In order to keep mediation operating within an acceptable range of meaningfulness and order, sender and receiver must work together to limit the entropy of these inevitable disruptions (Krajewski 2011, 5). As digitisation intensifies, scholars should of course remain vigilant to the noise it inserts into existing sociomusical channels. But that vigilance

must include the ongoing reciprocal actions whereby people mediate and remediate the noise of the digital, such that communication can proceed according to established expectations about what already constitutes good musical knowledge and behaviour. The digital is not an external force that transforms contemporary musical culture independently of human desire. Rather, musical engagements with the digital are the very materialisation of human desire, and in many cases desire is still difficult to disentangle from the modernist mythologies that ensure unequal flows of capital and concentrations of power.

Notes

1 Quebec's provincial arts council was established in 1994 as part of a multifaceted devolution of powers from the federal government following the failed Charlottetown constitutional accord. See Saint-Pierre (2003).

2 All translations from French-language sources are my own unless otherwise indicated.

3 Crucially, changes introduced to mark the 150th anniversary of Canadian confederation in 2017, in addition to being dedicated to the goal of fostering 'digital' innovation, have begun to break down these protective 'silos', encouraging applicants for funding to describe their own genre associations instead of submitting under predefined ones. It remains to be seen what effect this will have. See Everett-Green (2015).

4 She cites UNESCO interventions, André Malraux's *Maison de la Culture* programme in France and the decolonisation movements of the West Indies and Algeria as particularly influential. See Saint-Pierre 2003.

5 State support for cultural and social programmes has played a central role in marking nationalist political territory in Quebec. Comparative studies of the sovereignty movements in Quebec and Scotland emphasise how the drive towards devolution of powers has mirrored the decline of the welfare state since the 1970s. See McEwan (2006) and Henderson (2007).

6 While tuition rates for non-resident students are higher than those for residents, residency can be established by living in Quebec for one year before undertaking full-time studies.

7 Deleuzian metaphors are popular with Montreal's music and media art critics. See, for example, Letarte and Schütze (2002, 102–13); Charron (2008); Bachand (2009).

8 Interview with Nathalie Bachand, Montreal, 28 May 2012.

9 For an analysis of this earlier incarnation, see Fourmentraux (2007, 489–92; 2011).

10 Interview with Kevin Austin, Montreal, 16 December 2011.

11 Interview with Kevin Austin, 2011. For a similar account dating from the early years of the CEC, see also Austin and Lewis (1996).

12 Although I did not have access to official data for other years, I did note that women were outnumbered by a factor of twenty to one in the 2011 cohort of electroacoustic undergraduates at Concordia. Efforts to establish spaces for women in the scene began as early as the 1970s, but representation remains a pressing concern. See Lefebvre (1991), McCartney (2006), and Valiquet (2017). For analysis of the role that the Electra myth has played in historical efforts by men to enclose the expression of female sexuality in shame and taboo, see also Kramer (1993) and de Beauvoir (2011, 50–62).

13 See Truax (1984).

14 Interview with Jean Piché, Montreal, 16 May 2012.

15 Literally, 'current' music. See Stévance (2012).

16 Both comments are from a collective review in the Toronto-based journal *Musicworks* (Brooks et al. 1991).

17 Note that this was also the period when the antimodernist interventions of figures like McClary and Born first began to rise to the attention of anglophone musicologists.

18 Both have a long history in the feminist critique of science and technology. For a comparison, see Wajcman (1991).

19 For example, Adkins et al. (2016).

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8

The dynamics of pluralism in contemporary digital art music

Georgina Born

A heterogeneous field in motion

How to capture the transformation, from without and within, of a dominant art music genre? Academic electroacoustic music, and specifically acousmatic music, the modernist lineage that came to prominence from the 1970s in universities in the UK, Canada and Europe, has been both hegemonic and waning for around twenty years. Two influential articles bookend this period, announcing transitions 'beyond the acousmatic' and towards 'post-acousmatic practice', and attesting to this curiously slow fade (Adkins, Scott et al. 2016; Waters 2000). This chapter explores this state of affairs through an ethnography of British university trainings in digital art music and related scenes.[1] Recent years have seen major changes to the art music settlement in the UK: things are in flux, and this study gives insight into how and why. The aim is both descriptive and analytical: to probe the burgeoning pluralism of digital art music in the UK, as this presses on contemporary music writ large.

My fieldwork focused on three leading British academic centres: the Sonic Arts Research Centre (SARC) at Queen's University, Belfast, the Music, Technology and Innovation Research Centre (MTIRC) at De Montfort University, Leicester, and the Music and Music Technology groups at the University of Huddersfield. It also involved contacts with music departments at the universities of York, Edinburgh, East London and East Anglia, and the sound art research centre at London's University

of the Arts.[2] I observed teaching and events, and made relationships with teaching staff, masters and PhD students pursuing studies and research in degree programmes variously designated music technology, electroacoustic or computer music, sound art or sonic arts.[3] In this way I aimed to grasp how these programmes – which I gather under the term 'music technology degrees' – are taught, and how younger generations see the musical present in general and vis-à-vis their own practices. The fieldwork was predicated on a key finding: the rapid growth of music technology degrees since 2000, and their significant differences from orthodox music degrees (Born and Devine 2015).

By analysing the music technology degrees, the chapter maps a heterogeneous field in motion, buffeted by larger historical processes. A core premise is that educational change of this kind is both a barometer and a catalyst of wider musical, cultural, social and political changes.[4] The net effect of these changes is the blossoming of an extraordinary but patterned diversity of idioms in digital art music. Three themes run through my analysis: first, the emergence of a spate of challenges to prevailing classificatory boundaries – between music and sound, art and popular music, academic and nonacademic, digital and post-digital practices – manifest in transformative boundary work (cf. Gieryn 1983). Second, how such transformations can also entail challenges to established understandings of *what music is* – through forms of interdisciplinarity pervasive in these music practices that embody what might be called a logic of ontology.[5] And third, how the musicians that I encountered are engaged in 'making time' through creative practices that, through retentions and protentions, are simultaneously engaged in producing musical past, present and future.[6]

My fieldwork also radiated out internationally to related circuits beyond the UK: to music technology conferences,[7] events, festivals and performances,[8] funding bodies and other intermediaries. The fieldwork spread from digital to acoustic art music through the Huddersfield Contemporary Music Festival and other European 'new music' festivals. One feature of the study is how it arcs back to my earlier research on computer music at IRCAM (Born 1995); intermittent fieldwork at the Institute of Electronic Music and Acoustics in Graz and at McGill and Concordia Universities in Montreal opened up through propitious, including IRCAM, contacts, affording comparative perspectives. My method was therefore to overflow my starting point in British academia and follow fruitful tangents elsewhere. This was, for me, an unprecedentedly nonlinear form of fieldwork, creating a meshwork of national and transnational circuits. Research on electroacoustic music

centres in Leicester, Huddersfield and Montreal, for instance, made it possible to trace flows of mutual influence passing transnationally between them, as well as divergences.[9] The tracing of both imitation and differentiation expanded as my fieldwork sites multiplied, enabling me to capture these processes at a larger scale, across congeries of practices.

My focus on academic digital art music centres stemmed not only from the conviction that educational change both responds to and can accelerate wider cultural and social changes, but from a commitment to the powers of institutional ethnography. In general, ethnographies of cultural institutions 'offer an analytical meso-level, a meeting point of history and contemporary practice'. In addition, 'because of their scale and scope and the heavy investment of resources they demand, institutions intervene influentially in the history of the [cultural] fields they inhabit' through the creation and sustenance of repertoires, curricula and canons. Yet cultural institutions may also act as sites of 'emergence, expression and magnification of crises or transformations within those fields'. Moreover, they have the 'property of condensing complexity' in that they encompass a population constituted by both uniformities and divergences of ideology, cultural and aesthetic orientation (all Born 2010a, 190). These points are borne out in what follows, and comparatively: if in Montreal we found university courses in electroacoustic music largely unresponsive to the independent noise scenes outside their doors (chapter 7), in the UK the picture is different. Not only are the sounds of nonacademic artists seeping inside the lecture room, but the academy is unevenly responding to them. The chapter shows how new institutions may be created or experimental paths taken by existing institutions, amounting to what might be called institutional invention.[10] In sum, institutional ethnography allows one to examine the relations between social and aesthetic change as they are mediated by key institutions (universities, festivals, labels, etc.), as these processes contribute, in turn, to making history.

In writing at the outset of the burgeoning pluralism of digital art music in the UK, I raise the troubled concept of pluralism. Pluralism in the arts must be conceptualised and assessed in both aesthetic and social terms, and through the critically important interplay between them. This chapter focuses primarily on pluralistic aesthetic, philosophical and ideological shifts, but touches also on generational musical and social changes. To gain a fuller account of the social changes mediating the aesthetic transformations narrated here, the chapter should be read in conjunction with an article co-authored with Kyle Devine that is effectively its complement (Born and Devine 2015). That article analyses the

demographics of the student population taking the music technology degree programmes at the heart of this chapter,[11] drawing out key findings through comparisons with both orthodox music degrees and the general student population. It shows that music technology degrees wrought striking demographic changes: 90 per cent of their students are male (compared with 45 per cent on orthodox music degrees), and they have a lower social class profile than those on orthodox music degrees. The picture for race is difficult to discern, yet we contend that this may well be 'a case where a cultural-educational domain that is generally understood as ethnically unmarked or "non-raced" … is actually experienced as ethnically white and as linked to an invisible politics of whiteness' (Born and Devine 2015, 139; Rothenberg 2011; Ware and Back 2002) by those Black and ethnic minority young people who might otherwise have been interested in enrolling. Awareness of the music technology degrees' male, white, lower social class student profile should be kept alive when reading the chapter, which later recounts how the degrees enact certain shifts in musical and social boundaries to effect a combined 'musical-and-social pluralism' (p. 340). For while the music technology degrees have indeed broadened the social profile of students studying music, and in this way genuinely enlarge the music-higher-educational franchise, such shifts are put in perspective by their maleness and whiteness, pointing to the *limits* of their social-and-aesthetic pluralism. Pluralism, its blind spots and limits, return in the conclusions.

Two events – troubled musical times

I open with two events separated by thirteen years that illuminate changes in music's dominant classifications and their institutional foundations. First, an event enacting an epochal shift in relations between art and popular, academic and nonacademic digital musics. And second, a crisis signalling emerging competition between two wings of British art music.

The first event was the 1999 Prix Ars Electronica, an international prize-giving art and technology festival.[12] Music has a prime place in Ars Electronica and early honours were awarded to such figures as Karlheinz Stockhausen, Bernard Parmegiani, Jean-Claude Risset and Kaija Saariaho. In 1999 the category of 'Computer Music', there from the inception, was renamed 'Digital Music', reflecting the music jury's desire to broaden the kinds of music acknowledged by the Prix beyond what were perceived to be the narrow confines of modernist academic computer music. In parallel, the range of genres recognised and awarded

prizes expanded to include 'nonacademic' genres like electronica, techno, glitch, noise and drone, as well as live electronics, field recording, improvisation, soundscape composition and sound installation (Haworth 2016). The 'putsch' (Herrington 2001, 16) was heralded by an article by jury member Bob Ostertag, who criticised academic computer music's 'artistic stasis', centred on the Western avant-garde, and 'social self-interest', which he linked to 'the careers, salaries, and prestige of the individuals and institutions which benefit'. Ostertag posed academic computer music's diminishing aesthetic returns against the way that techniques now widely available, used in genres like 'techno, hip-hop, trip-hop, [and] trance', have 'revolutionized the way music is conceived, played, recorded, and appreciated, creating … new fields of expertise' (Ostertag 1996).

The changing make-up of the music jury encouraged the paradigm shift. By the late 90s it comprised 'distinctly non-institutionalised figures' (Herrington 2001) including experimental artists Jim O'Rourke, Robin Rimbaud and Laetitia Sonami, critic Kodwo Eshun and editor of *The Wire* magazine, Tony Herrington. Announcing the change of paradigm, Eshun titled his 1999 jury statement 'Music from the Bedroom Studios'. He cited Sonami's judgment on academic electroacoustic music: 'Because it's an academic world, it can live on its own … there's no commercial imperative, so you can keep this kind of bubble going'. Eshun went on to accuse 'the ancien regime of electroacoustic music' of 'awarding itself an undeserved authority at the cost of cultural irrelevance'.[13] The top prize went that year to what has become a classic of experimental music video, 'Come to Daddy' by the musician Richard James/Aphex Twin and video director Chris Cunningham, for its 'new digital aesthetic'.[14]

The 1999 shift drew a barrage of criticism from academic figures, who charged the jury with pandering to commercialism and passing fads. The senior academic composer Barry Truax, as an example, wrote an open letter arguing that 'the Prix A-E has lost credibility with those working in artistic/non-commercial forms of computer music because of the controversial and obviously biased results of this year's jury'. He urged the Prix to reconsider how Digital Music is defined and 'juried'; and in a bid to re-enshrine the high-low classificatory distinctions being actively dismantled, he added: 'One suggestion that has been circulating is to divide the [Digital Music] category so that "popular" and "artistic" styles are considered separately'.[15] Eshun's response was pointed: 'It's audible that our critics in the academic electroacoustic community have a visceral dislike of popular culture. For this sector, the entire value of the now defunct Computer Music Prize stemmed from its historical role as a refuge

from, a direct opponent of, and a zone of aesthetic superiority over the inescapable vulgarity of popular music.' The 1999 Prix thus enacted dramatic clashes at the borders of the tectonic plates of art and popular digital music, adding a new sheen of institutional legitimation to their changing articulation. In this way it accelerated wider musical transformations, making visible rifts that had been incubating for years (Hofer 2013).

Cut to 2012 and the second event: the eruption of a major crisis in British art music when a letter of complaint headed 'An open letter to Sound and Music and Arts Council England' was sent to *The Guardian* newspaper and a number of other media outlets. It was signed by over 250 composers headed by Colin Matthews, Nicola LeFanu, Harrison Birtwistle, Peter Maxwell Davies, Julian Anderson and others representing acoustic composition, those 'actively engaged with "Notated and Modern Composition"', as the letter put it. Their target was Sound and Music, a body formed in 2008 by the controversial merger of four organisations (the Society for the Promotion of New Music, British Music Information Centre, Sonic Arts Network and Contemporary Music Network), which had become a key intermediary in Arts Council England's public funding for contemporary music.[16] The writers complained that Sound and Music had 'within a remarkably short time … abandoned virtually all of the long-established and constructive activities of its constituent parts, largely in favour of a bland and unfocused endorsement of "sound art" and the promotion of relatively fringe activities which [have] little or no connection with the mainstream'. They continued that Sound and Music had 'pledged to continue promoting "Electronic and Improvised; Noise and Art Rock; Notated and Modern Composition; Sonic Art; Multimedia and Cross Art Form; Jazz, World and Folk; and Alternative Rock & Dance": areas of music which have many virtues but are for the most part entirely different from those for which Sound and Music was created'.[17]

I learnt about the letter from Andrew Hugill, a composer based at De Montfort University. With others, Hugill was drafting a response; it went public days later with about 60 signatures. This counterblast, signed by a coalition of experimental and electroacoustic musicians, sound artists and improvisers, deplored the narrow conception of contemporary music espoused by the original letter, noting that Sound and Music's task was 'made more challenging by the 42% funding cut [that it suffered] from Arts Council England last year'. It continued that in criticising 'Sound and Music's promotion of sound art and other music … as fringe activities … , the signatories appear to assert that notated, contemporary

composition should receive a specially privileged status within Sound and Music's activities … In a time when musicians and composers increasingly work across genres and media and defy simplistic categorisation, it is divisive … to seek to separate any one strand of contemporary music and sound from others or to plead for special treatment. Indeed, notated contemporary composition is itself a "fringe activity", in the sense of being a small minority pursuit.' The response concluded: 'It is by … interacting with each other, rather than ghettoisation or jealous guarding of limited conceptions of new music, that we will build a stronger and more successful community, and make possible that which is genuinely "new".'[18]

This exchange revealed open political conflict between contesting wings of contemporary art music in the UK. At stake were the claims of less recognised areas of practice for both recognition and a redistribution of the shrinking national pie of public funding. The exchange dramatised the ongoing assertion of boundaries between apparently rival traditions: on the one hand, an acoustic compositional 'mainstream' asserting its centrality against the 'fringe'; on the other, a pluralist coalition of experimental and electroacoustic composers, sound artists and improvisers advocating the defiance of categories, cross-genre and intermedial practices, while designating acoustic composition a 'small minority pursuit'. We will see that this putative coalition covers over important differences; in particular, the inclusion of sound art – which in the UK, as elsewhere, has mainly been nurtured institutionally in the visual arts sector, and which stretches the very definition of music – slides over tensions between sound art and other lineages. Nonetheless, just this coalition was prefigured by the Ars Electronica rupture of 1999, showing that Sound and Music were responding to wider transformations. This event, and the policies adopted by Sound and Music that triggered it, signal the growing audibility of the lineages making up the pluralist coalition, auguring a shift in the allocation of legitimacy and resources in contemporary music in the UK and elsewhere. Notably, the pluralist coalition occupies roughly the same territory as the music technology degrees where I did fieldwork.

Three constellations of change

How, then, should we understand the two events and the boundary clashes they enact? And what underpins the musical territory occupied by the new wave of music technology degrees? The next section portrays a nexus of synergistic historical forces that together illuminate the

conditions for, and the nature of, the music technology degrees. It does this by outlining three broad constellations of change, each consisting of multiple trajectories – distinct combinations of technological, musical, cultural, social, educational and political change.[19]

In writing of multiple trajectories I interweave two 'styles of analysis': from Foucault, the injunction to follow a 'procedure of causal multiplication' so as to analyse 'an event according to the multiple processes which constitute it, ... a polymorphism of the elements which are brought into relation' (Foucault 1991, 76–8). I combine this with William Connolly's approach to analysing 'a world of becoming' consisting of multiple interacting trajectories, each 'marked by pluripotentiality as it forms intersections with others', each with its own temporality and 'degree of agency' (Connolly 2011, 38, 27). In this way Connolly points to the emergent causalities that compose what will eventually be identified as history.[20] In what follows I suggest that the three constellations of change create through their entanglement the conditions for the music technology degrees and their reenactment of the musical present.

Having depicted the conditions within which the music technology degrees have emerged, in the second half of the chapter I chart ethnographically a range of music and sound art practices encountered in the degree programmes and wider fieldwork. My concern is to convey their exhilarating diversity, while teasing out certain patterns that traverse them. I do this by drawing attention to their genealogies and particular forms of interdisciplinarity, notably how they embody four species of the logic of ontology, each reshaping prevailing classifications – music and sound, art and popular music, digital and post-digital, academic and nonacademic practices – and each enacting alternatives to the ontology of acousmatic music and, more broadly, that of Western art music.

First constellation: technological, commercial and social trajectories

The last twenty years saw the exponential growth across the UK of the undergraduate and postgraduate music technology degrees at the centre of my study – a burgeoning range of music courses departing from the historicist, Western art music-focused curriculum of orthodox music degrees. The trend is shown by a 1,400 per cent rise in their undergraduate student numbers between 1995 and 2012.[21] The expansion of music technology degrees was led not so much by top-ranked universities – although Russell Group universities York, Manchester, Birmingham

and Queen's Belfast played formative parts[22] – as by former polytechnics: De Montfort, Huddersfield, East London, Central Lancashire, Birmingham City and others. Earlier, from the 1960s, a series of 'new' universities had created music degrees that integrated electronic music with other, sometimes new subdisciplines – popular music studies, music education and ethnomusicology. York inaugurated these developments, followed by City University and the University of East Anglia (UEA), and key individuals later involved in founding music technology degrees came through or set up the earlier programmes. Strikingly, the expansion of music technology degrees was paralleled by the closure of some music departments: Exeter (2005), Reading (late 2000s) and UEA (2012). Symptomatically, De Montfort's music department closed in 1995 but was reborn, after a strong result in Britain's 1996 Research Assessment Exercise, as a music technology centre.

The rise of music technology degrees was fed by the appearance from 1998 of music technology school-leaving examinations oriented primarily towards those school students wanting to take music qualifications but lacking notated music literacy and classical performance skills.[23] In contrast to traditional school-leaving music examinations, centred on the notated Western art music traditions of the seventeenth century to the early twentieth century, the music technology examinations promote aural and computer-based studio and compositional skills primarily in relation to electronic popular musics. By the late 1990s the new curricula were responding to the interests of a generation of musical, digitally-literate youth, a generation that was itself the creation of large-scale technological, commercial and social changes.

The 1980s and 90s saw an accelerating rise in the manufacture, purchase and use of affordable digital music technologies, with vast repercussions for the consumption and creation of music. Paul Théberge shows how the expansion of these technologies, enhanced by the interoperability wrought from 1983 by the MIDI protocol (Diduck 2018), propelled profound shifts in musical practice. Yet this period, he shows, represents the latest watershed in a long history of the creation of markets for consumer music technologies. Pre-echoes can be found between 1780 and 1850 when the expansion of piano manufacturing and music publishing met the demands of the emerging European middle classes for amateur music-making. At the turn of the twentieth century another phase occurred with the invention of the pianola. This time, 'fundamental changes in cultural values and patterns of consumption [preceded] … the new technical capabilities. [For] the pianola was a new kind of musical instrument [requiring] no particular skill on the part of the operator'

(Théberge 1997, 23). In response to competition from the pianola, piano manufacturers sought new markets by promoting the piano as the infrastructure for music education in American public schools.

This genealogy – demonstrating the entanglement of technological innovation with powerful economic interests, the search for new (including educational) markets, and social and cultural changes – provides a backdrop for the growth of markets for analogue and digital consumer music technologies in the late twentieth century. The 1980s and 90s brought a 'new cultural formation': a shift in the relations between production and consumption in numerous areas of popular music and culture. Technologies intended for consumption became powerful means of 'a kind of production practice within consumption … In effect, the listener is invited to act as a producer/engineer, to experiment in arranging and re-recording material that is familiar, pre-formed, and yet still in a malleable state' (Théberge 1997, 251, 253). Such processes were themselves prefigured from the 1960s by widespread uses of cassette tape and the dubbing enabled by double cassette decks, practices that became politicised in the punk DIY practices of the late 70s (Laing 1985). But they were intensified from the early 80s by the release of a host of low-cost digital music technologies. Théberge cites Tricia Rose on rap producers' inventive uses of digital samplers and drum machines like the Roland TR808: 'using the machines in ways that have not been intended, … rap producers developed an art out of recording with the sound meters well into the distortion zone' (Rose 1994, 75).

Théberge stresses two features of the new cultural formation. First, how musicians were persuaded to consume quantitatively more technology than in the past, encouraging a particular 'pattern of consumption' (Théberge 1997, 245). The use of digital sound processors became 'more abstract, formal, and quasi-mathematical than the "practical logics" (Bourdieu 1990) – visual, aural, tactile – formerly associated with analogue synthesis and with music-making more generally' (1997, 212). Second, such abstraction fed the rise of new industries marketing prefabricated sounds and sound-manipulating and -editing programs, signalling the 'incursion of capitalist relations [into] … creative practices' at a fundamental level (1997, 255).Théberge charts the accelerating growth of a nexus of such industries supplying different facets of the consumer music infrastructure: from samplers, synthesisers and drum machines to software extensions, sound libraries, headphones, recorders and mixing consoles, and eventually laptops. Evident is the sheer 'expansion in the range of technology deemed necessary for contemporary amateur and semi-professional practice'

(1997, 244). Complementing his argument is Hesmondhalgh and Meier's analysis of the role played by inter-sectoral competition and cooperation between the music, consumer electronics, telecommunications and IT industries in driving successive waves of innovation in music technologies over the twentieth century. Like Théberge they stress a coercive dimension: how each wave was 'pushed onto the market by powerful corporations "outside" the music industries … imposed on consumers via marketing and the strategic withdrawal of "outdated" goods' (Hesmondhalgh and Meier 2017, 7).

Implicit in these accounts is a dual expansion in the sheer numbers and in the class base of the consumers targeted by the hydra-headed consumer music technology industries, beyond middle class markets. This study adds perspective: for the students on music technology degrees represent an important subset of these target consumers, and they have a lower social class profile than the upper-middle-class students admitted to traditional music degrees (Born and Devine 2015). In this light, the UK's music technology degrees amount to higher education's response to the appetite for music trainings stimulated by the history related by Théberge among those young people uninterested in, or without the literacies to access, classical music degrees – trainings that build on their autodidactic digital skills.

Since the late 90s the internet has compounded the capacity for self-education on the part of such digitally-literate musicians, as well as their desire for trainings that build on these skills. The internet rapidly became a tool for learning, providing easy access to music archives, research and software, and channels for music's production and circulation outside academia. In these ways, in the words of a leading nonacademic figure, the internet helped to 'give birth to new trends in computer music'. 'A non-academic composer can search the internet for tutorials and papers on any given aspect of computer music to obtain a good, basic understanding of it'; technical knowledge is gained through 'self-study, countless hours deciphering software manuals, and probing internet newsgroups' (Cascone 2000, 12, 17). The result is that 'sound synthesis and signal processing techniques … developed in research institutes and published in academic periodicals like the *Computer Music Journal* [circulate] amongst musicians who previously had little or no access to them' (Haworth 2013, 188; 2015). Together, the trajectories charted in this section have engendered a swelling population of digital musicians (Prior 2010): some become students on music technology degrees; some inhabit nonacademic scenes flourishing around alternative institutions like the labels Warp, Mego, Mille Plateaux or Raster Noton and festivals Sonar,

Transmediale or MUTEK. Recent decades have therefore seen the escalating growth of 'prosumer' digital music practices incubated outside academia, a multitude of 'de-scriptive' (Akrich 1992) engagements with consumer technologies and laptops running open source software or 'cracked copies of commercial software' (Schedel 2007, 30).[24] The internet's powering of a centrifugal movement of sounds, knowledge and software out from the academy into the spaces of nonacademic practice signals a morphing of institutional boundaries and forms with profound reverberations; while the achievements and demands of nonacademic musicians put pressure on academic computer music, evident in the 1999 Ars Electronica event.

Second constellation: institutional, political and interdisciplinary trajectories – music in the neoliberal university

A second constellation consists of political and institutional trajectories that together fostered the growth of the music technology degrees, notably an array of policies advanced since the 1990s to effect root and branch reform of British universities. These policies are central to debates over the neoliberal university, which chart a slew of dramatic shifts: the decline of government funding and pursuit of policies to marketise and corporatise public universities; the marketisation of student education; the tying of education and research to goals of economic competitiveness, employment and social needs; and the elevation of private sector management techniques (the 'new public management'), including greater 'accountability' to the public and external stakeholders through the auditing of research (REF), teaching (TEF) and 'customer satisfaction' (NSS).[25] Such changes are linked to the idea that universities are key drivers of the 'knowledge economy'; in consequence, 'recognition of [the] economic importance of higher education and the necessity for economic viability has seen initiatives to promote greater entrepreneurial skills [and] the development of new performative measures' (Olssen and Peters 2005, 313, 324).

One feature of this reorientation is the rebalancing of research funding between the sciences and the arts and humanities. According to Stefan Collini, 'The huge growth in the costs of "big science" … [means] that the science budget has now soared into the billions, dwarfing the amounts spent on the humanities and social sciences.' He cites figures for 2012 (Collini 2012, 32) similar to those for 2016–17, when the total budget of the UK research councils was *c.*£3 billion, of which *c.*3–3.5 per cent went to the Arts and Humanities Research Council (AHRC). At the same time,

given declining government confidence in their value,[26] the arts and humanities have attracted economistic policies. From the mid-90s New Labour advanced policies to build 'creative industries' (British Labour Party 1996). Henceforth the arts, re-designated creative industries, were identified 'with a "new economy" driven by "digital" technologies and closely related to the "information" or "knowledge" economy'. The exploitation of intellectual property rights was central to this agenda, 'positioning the creative industries at the forefront of economic competitiveness' (O'Connor 2007, 51). In these ways the creative industries, and from the mid-2000s creative economy, paradigms have 'crowded out conceptions of culture that are not in some way subordinate to economic considerations' (Schlesinger 2017, 74). They enact a 'libidinalisation of entrepreneurialism' across Britain's public arts and culture (Born 2002, 269).

These developments therefore encouraged the transformation of the arts and humanities in British universities through rubrics of creative economy, knowledge transfer and public-private partnership, as these are equated with innovation, startups and spin-offs, public engagement and student employability. In a spectacular governmental re-engineering of the very ethos of the arts, including music, they have come to be seen as incubators of entrepreneurial values (Behr 2015; Hewison 2014). In the past decade the AHRC has led the way, promoting such schemes as 'Knowledge Exchange Hubs for the Creative Economy', 'Knowledge Transfer Partnerships' and a 'Creative Industries Clusters Programme'. In this initiative, 'part of the Government's Industrial Strategy, a record £80m-plus is being invested to create a step-change in collaboration between the country's internationally-renowned creative industries and universities across the UK … [The programme] will help catalyse economic growth and provide the skills needed for the jobs of the future.'[27]

Among the arts, music has been particularly susceptible to the new policies, and for two reasons. First, as portrayed in the first constellation, music's intensifying relationship with new technologies over the last fifty years, and so with engineering and industry, and the vast markets for consumer music technologies fuelled by these developments, render music especially receptive to creative economy policies. The music technology degrees, intended to cultivate technological and scientific as well as musical skills, had only to add rubrics of innovation and enterprise to adapt; they represent, as a consequence, a prominent response to these policies in British higher education. Second, popular music had been a key influence on the cultural industries idea: according to Justin O'Connor, experiments in the 70s and 80s in culture-led urban

regeneration modelled on the independent music economy by city authorities in Sheffield and Manchester fed New Labour's creative economy policies – even if New Labour sought to disown the socialist legacies of the city authorities.[28] Moreover, music has long enjoyed synergistic relations with other media industries (radio, film, television, games), which have multiplied in the digital era, compounding music's perceived capacities to fuel economic and employment growth.

Another trajectory, coincident with these developments, was the promotion in the universities from the mid-1990s of an influential discourse on interdisciplinarity – to which the music technology degrees, in combining music with scientific and technical skills, clearly respond. Michael Gibbons, a leading proponent, argued that 'in many areas of scientific advance, knowledge production is cutting loose from the disciplinary structure generating knowledge' (Gibbons 1997, 1). This was evident in a transition in the 'mode of knowledge production' from mode 1 to mode 2: 'Mode 1 is disciplinary while mode 2 is interdisciplinary. Mode 1 is characterised by homogeneity, mode 2 by heterogeneity of skills. Organisationally, mode 1 is hierarchical … while mode 2 is more heterarchical … In comparison with mode 1, mode 2 is more socially accountable and reflexive' (1997, 3). This discourse on interdisciplinarity, advanced in a spate of publications (Gibbons 1994; Nowotny, Scott et al. 2001), was coeval with the ascent of neoliberal university policies and came to inform science and research policies in Europe and elsewhere. Yet importantly, while the mode 2 paradigm resonates with neoliberal ideas, it also holds out more progressive social and epistemological visions.

In fact, the discourse of mode 2 elides three distinct 'logics' of interdisciplinarity that can be discerned in practice (Barry and Born 2013), and that I identify later in a range of current music and sound art practices. A first logic of interdisciplinarity, the logic of innovation, embodies the neoliberal emphasis on harnessing technological innovation to boost economic growth. In music it appears when creative practices or scientific research on music are employed to generate technologies or applications in partnership with industry or for commercial development. A second logic, the logic of accountability, highlights how interdisciplinary practices can foster new relations with publics or stakeholders – in music heightened, for example participatory, forms of engagement with audiences. A third logic, the logic of ontology, points to how interdisciplinary practices can produce ontological transformations in given fields through the generation of novel subjects, objects and relations of research – where such transformations can be identified by tracing the

path-dependent genealogies of the particular fields at issue. The three logics can be more or less pronounced in any interdisciplinary practice, and are often entangled. Nonetheless, the logics of innovation and accountability amount to distinctive types of instrumentalisation of research, in contrast to the logic of ontology. I show later how all three logics are manifest in the interdisciplinary practices pursued by my interlocutors, but I emphasise in particular the diversity of forms taken by the logic of ontology, each enacting a break with the ontology of Western art music (Born 2005).

A further trajectory is the rise in the last twenty years of the paradigm of artistic research, practice-led or practice-based research (PBR).[29] Although a wider international development, in Europe PBR was fuelled by the standardisation of higher education into a 'three-cycle system' under the EU Bologna Process, which catalysed the academicisation of vocational arts courses, a shift to practice-based doctoral programmes across the arts, and a resiting of these trainings in universities as opposed to art schools. Henceforth, hybrid PhD programmes with a mandatory research element favoured 'research' practices in music and the arts. The precise epistemological and artistic status of PBR, the appropriate relationship between it and the academy, and the academicisation of arts trainings all remain contentious matters (Borgdorff 2012; Croft 2015; Wilson, Gorenec et al. 2013). Nonetheless, arts doctorates combining artistic practice and a research component have mushroomed internationally and are the model favoured in the British music technology graduate programmes.

In music, the effects are pronounced: composition PhDs combining a composition portfolio and a theoretical thesis reflecting on compositional practice have flourished. A series of less obvious effects are also evident. In the UK there has been an expansion of the sites in which composition PhDs can be pursued, which as well as established music departments and conservatories now include departments that support degrees in music technology and sound art. This expansion has been accompanied by a liberalisation of what counts as a composition training and compositional practice. On the one hand, the rise of a mandatory research element has been coincident with the aesthetic, conceptual and ontological openings described later in this chapter – notably, the growing presence of interdisciplinary experimental music and sound art practices some of which, I will suggest, embody a logic of ontology. On the other hand, given diminished funding and the clamorous calls for research oriented to the creative economy, the research requirement also favours fundable kinds of interdisciplinarity manifesting the logic of innovation:

projects where music is linked to scientific or technological innovation. As we will see, the heady mix of neoliberalism, digital technology and commerce-friendly innovation charted in this constellation has engendered since the 2000s profoundly consequential counter-reactions among musicians – in the form of novel, *non*-'innovation'-oriented musical materialisms and the idea of the 'post-digital'.

A related, final trajectory in this constellation, often overlooked due to its status as a disappearance, concerns the way the Bologna Process and the ascent of arts doctorates have been accompanied in the UK by the decline of public art schools – which in recent decades have been closed or incorporated into larger units. Founded in the late nineteenth century and the twentieth century to provide trainings in technical and design trades like printing, textiles and ceramics as well as the fine arts, public art schools grew in many British cities and integrated technical and aesthetic educations. Two features of these art schools were especially salient: first, the nature of the education, characterised by 'a tension and oscillation between art and industry, free production and "useful" design' (Banks and Oakley 2016, 43). Thus, according to a former teacher, learning occurred 'very largely through personally directed conceptual and material experimentation. The teaching "input" can only ever be highly speculative' (Thompson 2005, 216). And second, their role in providing alternative routes to further and higher education for bright working-class and lower-middle-class students excluded or self-excluding from university education.

The result of these two features has been the critical contribution made by art schools since the 1950s to the efflorescence of British popular music and culture (Frith and Horne 2016; Laing 1985, 168; Walker 1987). Art schools were 'the epicentre of those aesthetic innovations that [produced] the British beat boom, progressive and glam rock, punk, post-punk and New Romanticism' (Banks and Oakley 2016, 47); while for influential nonacademic electronic musicians whose music crosses the pop-art divide, art school was a formative milieu. The musician Mark Fell, whom I met initially as a York PhD student, attended Sheffield's Psalter Lane art school: 'As is so often the case, the art school was inextricably interwoven with the city's various music scenes. In the late 80s, with the onset of Sheffield's "techno era", Psalter Lane not only provided event spaces, but more importantly gave us access to technical resources: digital video editing and processing, sound studios, crude computer graphics systems, and so on. The majority of its students were part of Sheffield's music scene … : Phil Wolstenholme, for example, designed many of the images used on early Warp covers; others were DJs or producers.' Yet Fell points to a constitutive tension: despite 'a constant flow of students from

the art school into the underground techno world, the relationship between the institution and the dance floor was not always an easy one. The tutors … had a limited understanding of this world, not only in the use of sound in creative practice but also the particular musical and cultural references' at stake (Fell 2018). The coincidence of the decline of art schools and rise of music technology degrees may help to explain why the latter have come to offer alternative trainings for youth from lower social class backgrounds wanting to work in music (Born and Devine 2015) and aspiring to reshape the boundaries between art and popular music, music and sound.

Specificity: four institutional histories

The trajectories portrayed in the previous section together condition the academic centres of digital art music that are the focus of my study. However, in each case the centres are also entangled in particular institutional histories, engendering different qualities of invention and change. To understand the growth of the music technology degrees, then, it is necessary to trace how the trajectories described play out in relation to these specific histories.

In the creation of music technology centres at both SARC in Belfast – perhaps the leading British centre, 'our IRCAM'[30] – and MTIRC at De Montfort, the cultivation of innovation, entrepreneurialism, interdisciplinarity and knowledge transfer are much in evidence. But the two histories are also different. SARC's creator, the composer Michael Alcorn, traces a web of contingent forces: his visit to the world-leading computer music centre CCRMA at Stanford;[31] Queen's University's interest in galvanising interdisciplinarity; the possibility of collaborating with electrical engineering and the availability of large strategic research infrastructure grants to bid for; engineering's record of being entrepreneurial, including a startup buyout by Solid State Logic; an Irish high-tech zeitgeist signalled by the arrival in 2000 of the Dublin-based Media Lab Europe; and a political climate, post-devolution (1998) and with New Labour in power, in which interest in the creative economy and its potential to address urgent needs for employment and urban regeneration in Northern Ireland was mounting. In Michael Alcorn's words:

> MA: '[In 1999] I'd just spent a year at CCRMA in Stanford, and had observed very closely … how a place like that worked. I was very aware that the best things that could come in the next while would come through fruitful collaboration with people in other disciplines. We talk a lot about interdisciplinarity, but within Queen's when we

got this thing going it was fairly rare. So I was immersed in what was happening at Stanford; [and] basically I described my own vision for what I thought [SARC] could be – I think it came back 24 hours later saying, ‘could you put a price tag on it?’ It was a bit of a back-of-the-envelope guess, but I thought it would cost about £4.5 million to build something of real significance. At that stage I was just a senior lecturer, ... perhaps not finely tuned to the business processes of the university. [But] this is not the first time this happened. In 1994–95 I submitted a grant application to buy the IRCAM signal processing workstation … Much to my surprise it was supported [by strategic research infrastructure funds]. A number of people looked over their glasses at the proposal, because here was something from the Arts and Humanities looking for £50,000! That taught me a valuable lesson: if you’ve got a good idea, don’t undersell yourself just because you’re arts and humanities … At that stage,'99 or 2000, there was a lot of investment in Ireland in high-tech companies; Media Lab in Dublin was [being] set up … I was aware that [an electrical engineer] from Queen’s had developed this thing called OneBit technology, [and] he set up a company [that was] bought up by Solid State Logic … So there was a bit of history in Queen’s already about audio processing … I learned a huge amount from the engineers: they would bounce things back at the time of drafting, saying, “that’s not a sound business reason” …’

GB: ‘So the engineers were responsive to relationships with business, spin-offs and so on?’

MA: ‘Yes, very much, and it was unheard of then in the arts and humanities. That made me aware those links [had] to be cultivated, and willingly: I was happy to be thrust into having meetings with Invest Northern Ireland and other such people, to see what we could do.’[32]

The new four-story SARC building, ‘one of the leading research environments in the world’ and modelled broadly on Stanford’s CCRMA, opened in late 2003. At the time, SARC was the recipient of the largest single research grant ever awarded to the humanities at a British university, given jointly by a philanthropic organisation and Northern Ireland’s Department of Employment and Learning (Gilmore 2008). In due course SARC attracted additional grants from multiple sources and was involved in startups, industry partnerships and patents, as well as in government-sponsored talks across public-private lines (linking Arts

Council Northern Ireland, the Department for Enterprise, Trade and Investment, the Department of Culture, Arts and Leisure, Invest Northern Ireland and industry bodies Momentum and Digital Circle) to develop a 'creativity hub', 'a gateway between SMEs and the university'. In 2011 the School of Music, in which SARC sat, was restructured with Drama and Film into a larger unit, a School of the Creative Arts. In the wake of the closure of UEA's music department, the shift was seen as enhancing interdisciplinarity, student employability and potential industry partnerships, and as a buffer against any threat of closure.

De Montfort's Music, Technology and Innovation Research Centre (MTIRC), in turn, is portrayed by its founder, composer and technologist Andrew Hugill, as resulting from both teaching innovations and entrepreneurial successes on a grand scale, notably the capture of very large grants for digital humanities, research infrastructure and a transdisciplinary research centre. Having closed the Music department in 1995, and following Music's success in gaining the university's highest score in the 1996 Research Assessment Exercise (RAE), the Vice Chancellor asked Hugill what the resulting RAE funds should be spent on. Hugill requested a new recording studio and began to teach a university-wide music technology module: 'Well, there were queues around the block … and within two years we had a full-time degree and a research centre.' From 1999 the new MTIRC grew, attracting international figures, as one among a number of interdisciplinary centres under the umbrella of the Institute of Creative Technologies (IoCT). Hugill explains the origins of his transdisciplinary institutional vision:

> It's serendipity. I was sat in a meeting chaired by the Dean in my faculty, who had become a Pro-Vice-Chancellor. She'd invited me to contribute to the discussion on the creative side. A few years before I'd got a grant from [HEFCE][33] to set up something called the Centre for Technology in the Arts, a kind of digital humanities research centre … So because I'd done that she invited me to this meeting to look at a big science research infrastructure fund from HEFCE that we were invited to bid into. At the meeting she said, 'So who's going to bid for this?'. I was expecting one of the Deans – all the Deans were there – to say 'Yes I'll pick that up'. To my surprise, none of them did; there was total silence. I thought, 'Well I see possibly £2 million on the table, and no one wants to pick it up!', so I said, 'I'll bid for it.' And she said, 'Are you serious?', and I said, 'Absolutely! I've got a great idea!' and I'm thinking on my feet and I said, 'We'll

> make a transdisciplinary research centre!' And she said, 'That sounds fantastic – write it up!' and I did and needless to say we won the grant. That's the story; it was just opportunism. In the end it was £1.3 million [for the IoCT], working across the university: Art and Design, Humanities, Computer Science and Engineering.[34]

Influenced by the theorist of transdisciplinarity, Basarab Nicolescu, the IoCT had an annual budget of £1 million in its early years and raised £7 million in external funding, employing some 95 people on over 100 projects. It also supported Knowledge Transfer Partnerships (KTP), collaborations between university and industry. One KTP involved James Hendler, a leading American AI and semantic web researcher, and aimed to prototype a 'creative encounter' web surf engine based on 'pataphysical' algorithms (Hendler and Hugill 2013).

Less obvious are the roots of these developments in De Montfort's pre-1992 existence as Leicester Polytechnic, a key incubator of experimental and improvised musics. Founded in 1870 as Leicester School of Art, the Poly was formed in 1969 by the merger of colleges of art and technology and grew around the fine and practical arts. In 1971 the composer Gavin Bryars began teaching in the Fine Arts department. In the 1980s he founded the Music department, contributing to a Performing Arts degree, employing fellow experimentalists John White, Christopher Hobbs and Dave Smith (affiliates of Cornelius Cardew, Hobbs a sometime member of the group AMM)[35] as well as Hugill, and bringing in John Tilbury, Evan Parker, Steve Lacy and others. It was the strong research outputs of the core group that resulted in Music's high score in the 1996 RAE. Virginia Anderson places this 'Leicester School' at the heart of British experimental music (Anderson 2014), noting that although they drew influences from Cage, Tudor, Feldman, Wolff and Fluxus, they differed markedly from American experimentalism. The group shared an ironic attitude to the canon, a democratising bent and an attraction to then-marginal composers (Satie, Grainger, Cage, Cardew), creating an eclectic alternative canon that treated 'high art, neglected art, and so-called low art with equal admiration and equal humor' (2014, 165). Particularly important were their links to the visual arts, pointing to the central role of British art schools in nurturing experimental as well as popular musics. In addition to Leicester, art schools in Portsmouth, Bath and Winchester fostered the emergence of experimental music in dialogue with the other arts; contacts with systems artists, for example, led White, Hobbs and others to develop systems music, 'the first original process minimalism in Britain' (2014, 165). Bryars' Leicester curriculum included courses on twentieth-century music and improvisation, and students were encouraged to 'try all

disciplines' (2014, 168). Through their educational programme the Leicester group sought in this period to establish an 'institutional basis for their branch of English experimentalism' (2014, 169).

A striking question is why from the late 1990s music at De Montfort took a strong technological turn. This effectively enshrined electroacoustic art music, and specifically acousmatic music, as the core aesthetic and intellectual discipline, encouraging its ascent, while eclipsing Leicester's experimental roots. The answer lies in the trajectories outlined previously: music technology drew large student numbers, boosting the market for the degree; while music-science interdisciplinarity, and its logic of innovation, supported expansive entrepreneurial activity in the field of 'creative technologies', yielding intellectual, applied scientific and financial rewards. With the high expectations of Music at De Montfort, when appointing senior staff to the MTIRC it was obvious that 'blue chip' figures would be sought, capable of internationalisation, grant-getting and outreach, and/or recognised as outstanding acousmatic composers. By the mid-2000s, the appointment of Leigh Landy, Simon Emmerson and John Young fulfilled these expectations. Landy edits the major journal, *Organised Sound*, and runs high-profile international research networks and conferences in collaboration with the Groupe de Recherches Musicale (GRM), the Center for Art and Media at Karlsruhe (ZKM), the Sorbonne, Université de Montréal and others. Emmerson is a composer-theorist, a founder in 1979 of the Electroacoustic Music Association of Great Britain, a board member of its successor, Sonic Arts Network, and a leading international figure in the electroacoustic movement.

The nature of institutional invention evident in Huddersfield University's music technology initiatives is different yet again. Through the dual role of Richard Steinitz as a professor of composition and founding director in 1978 of the Huddersfield Contemporary Music Festival (HCMF), the Music department at Huddersfield has been intimately linked to contemporary art music. The university is a partner of the HCMF, Britain's largest international festival of 'new and experimental music', and acoustic composition has flourished at Huddersfield. Steinitz also built an electronic music studio, and today music is taught at undergraduate and postgraduate levels alongside an expansive bouquet of music technology degrees. Music has long been the jewel in the university's crown due to the festival's international renown, the high standing of its artistic and research activities, and its successful teaching programmes. At the time of fieldwork, Music and Music Technology were subject areas in a Department of Music and Drama,

itself located within a School of Music, Humanities and Media. The structure allowed for maximum integration of music teaching with related disciplines, with further links to Engineering.[36]

Huddersfield's entrepreneurial route has been to capitalise on innovation in HE markets by producing the largest portfolio of music and music technology degrees in the UK, attracting high student numbers.[37] The origins lie in the early 1990s when a music technology course was created jointly with Engineering, leading to either BA or BSc awards. As the course took off, more staff were appointed, and Engineering began to offer separate audio-engineering degrees. The result was a suite of courses, from the established BMus to an array of music technology, popular music and joint 'music-and' humanities courses. In 2012 it comprised fifteen degrees,[38] and a similar number are offered today. This canny differentiation of degrees fine-tunes their attraction to student-consumers. Income from the portfolio of degrees has allowed Huddersfield to expand its music staffing, artistic and research ambitions. The Centre for Research in New Music (CeReNeM) was founded in 2006, a 'flagship institute' of the university supporting a lively postgraduate programme as well as a stream of compositional and PBR, curatorial, publishing and international networking initiatives. Huddersfield has become a world-renowned centre for PBR, hosting composition- and performance-related research MAs and PhDs. All of this complements Huddersfield's forty-year commitment to HCMF, bringing acoustic and electroacoustic composition into close proximity on a larger scale than at any other British university. Signalling this eminence is the capture of major international research grants by composer-researchers including Michael Clarke, who initiated many of these developments, and Pierre Alexandre Tremblay, as well as the international careers of CeReNeM's former and current directors, Liza Lim and Aaron Cassidy.

Overall, as a result of the trajectories described, the music technology programmes at SARC, MTIRC and Huddersfield converge on electroacoustic art music, and within that acousmatic music, as core curriculum – synergistic as this genre's infrastructural demands and interdisciplinary make-up are with PBR and creative economy agendas, and with the logic of innovation. All three centres engage in international networking in electroacoustic music and related scientific fields, fuelling an inflationary cycle of mutual valorisation and legitimation characteristic of artistic fields (Born 1995, 91–4). Yet while all three respond to the policy climate described, the institutional invention manifest in each has generative effects that are irreducible to such policies. They share an educational philosophy in which musical and technical creativity are considered intimately interrelated. And despite the primacy of acousmatic

music, pluralistic aesthetic currents are present: live electronic, interactive, sound installation, environmental sound, visual music, noise and other practices are recognised if not taught. Pluralism is clearly espoused in this summarising vision by a senior figure: ‘In a sense you have a kind of synthesis – an IRCAM, Stockhausen or GRM aesthetic – and an antithesis, which is all this post-digital stuff. I'm much more into a broad synthesis, ignoring the pop-art divide … and just having this wonderfully broad palette where a typical concert of student work will go from a DJ to self-built instruments to a beautifully-spatialised acousmatic piece, to an audio-visual, to an algorithmic "let the thing run"-type piece – process or concept art. They're all equally valid as far as I'm concerned.'

Yet the reality is somewhat different: more than twenty years after the Prix Ars Electronica's attempted ‘putsch’, acousmatic music still occupied the centre ground in these programmes, led by an upper generation whose careers had forged the genre. Other practices, with their alternative aesthetics and ideologies, generally had secondary status; and popular music, despite the committed stance of some staff, occupied the curricular margins, awkwardly or ambivalently incorporated or hived off into separate degrees. Tensions surrounded this settlement, which chafed against many students' musical histories and passions; it was therefore a mobile settlement since, under pressure of student interest, effort and ingenuity were being expended to bring the musical worlds of students and teaching staff into alignment. Such boundary work (Gieryn 1983), reshaping the boundaries between art and popular music, and music and sound, underlay some of the most interesting aspects of the educational experience, as I show later.

The three institutional histories outlined are in marked contrast, finally, to a fourth one. It concerns the BA and MA Sound Arts degrees hosted by the London College of Communication (LCC), part of London's University of the Arts, and the related Centre for Creative Research into Sound Arts Practice (CRiSAP), and loops back to the 2012 Sound and Music crisis. For the LCC programme embodies a distinct genealogy from academic electroacoustic music. Where the counterblast coalition defending Sound and Music purported to represent a united front of electroacoustic and experimental musicians, improvisers and sound artists, in fact this conceals a host of aesthetic, political and institutional divergences. The LCC programme, the leading academic base for sound art in the UK, was created by composer Cathy Lane and took off from the late 1990s. Lane got into music after a humanities degree by taking courses and then teaching in community recording studios, adult and further education contexts, notably Morley College, before gaining an MA at York and a PhD

at City University. Morley, where Lane gained her first studio experience and where Cardew, Barry Anderson, Hugh Davies, Philipp Wachsmann and others had taught, was another key centre of British experimental, electronic and improvised musics.[39] Under management pressure to offer marketable programmes, Lane stressed how 'we spent a lot of time saying what we *weren't*: we weren't a music course, … a music technology course, [or a] sound design course'. Instead, central to the programme's identity was 'the sound art tradition coming from the European visual arts',[40] including sound installation, environmental sound, soundscape, site-specific sound and field recording practices and related research, along with a variety of politics of music and sound. Earlier, Lane was involved in the Sonic Arts Network, the UK's main electroacoustic music organisation, but found it gendered and aesthetically and epistemologically restrictive. Partly as a result she became involved in activist projects, among them studios aimed at women and the underprivileged, and activism remains integral to her conception and teaching of sound art practice through initiatives like the feminist Her Noise archive (Lane 2016).[41]

CRiSAP opened in 2005 and over the next decade became a leading international research centre. Although distant from the music-science interdisciplinarity of electroacoustic art music, the resonances between sound art practice and the academic take-off of interdisciplinary sound studies led CRiSAP to develop alternative forms of PBR. CRiSAP's staffing grew following success in the 2008 RAE, as well as the explosion of public interest in sound art aroused by works such as Janet Cardiff's 'Forty Part Motet' (2001) and art-world events like 'Sonic Boom: The Art of Sound', Britain's first major sound art exhibition curated by David Toop at the Hayward Gallery in 2000, the 2010 Turner Prize, won by sound artist Susan Philipsz, and the year-long canonic exhibition 'Sound Art: Sound as a Medium of Art' held at ZKM in 2012.[42] Among the staff appointed were figures closely associated with free improvisation and its home from the 1970s, the London Musicians' Collective (LMC): Peter Cusack, David Toop, Max Eastley and others. For Lane, they brought 'a genuinely open and experimental attitude to sound', and they connected CRiSAP to wider currents in the arts including conceptual, intermedial, site-specific and instrument-building practices. Central to CRiSAP's success has been its capacity to build institutional alliances by capitalising on sound art's rising audibility and its ability to draw bigger audiences than those for most types of contemporary art music. I myself became aware of CRiSAP when asked to contribute to a sold-out symposium at Tate Modern in 2012 called 'Her Noise: Feminisms and the Sonic'.[43] Other CRiSAP events have been held jointly with Tate Britain, the British Library and the National Sound

Archive. An overtly feminist politics is one feature of this scene; another is its emergence from earlier lineages of British experimental and improvised musics. Lane and her colleagues have, then, forged networks with leading visual arts and cultural organisations quite different from those of electroacoustic art music, and they are able to do this because – in contrast with electroacoustic art music – sound art draws large audiences.

CRiSAP's strengths are compounded by its links to the LMC, which in the 90s became increasingly professionalised, one of an emerging nexus of alternative institutions supporting experimental music (Bell 1999). From 1992 the LMC created *Resonance* magazine, and from 1998 Resonance 107.3 FM, an internet radio station playing and commissioning experimental music and sound art (McKay 2010); while in 1999 the LMC's Annual Festival of Experimental Music moved to London's South Bank, headlining Pauline Oliveros and crossover electronica artists Christian Fennesz and Peter Rehberg. From the 2000s CRiSAP's activities came to be amplified by *The Wire* magazine and, from 2008, London venue Café Oto. CRiSAP evidences, then, strategies to cultivate artistic, cultural and social capital: based in London's arts university and buoyed up by sound art's popularity, they entail making energetic connections to visual arts organisations and an array of alternative institutions and networks. Where the counterblast coalition forged by the Sound and Music crisis portrayed electroacoustic art music and sound art as fellow travellers, things look different from CRiSAP, where a distinctive set of networks and aesthetic and ideological affiliations prevails.

Third constellation: aesthetic trajectories – remaking musical past, present and future

Against the backdrop of the two previous constellations, what music was being taught, composed, made and performed in the music technology degrees? And what were the musical interests of my interlocutors – students and faculty associated with these programmes? A third constellation consists of aesthetic trajectories gleaned from these interests and practices. Together they add up to a strenuous if decentred reshaping of post-World War II music history, a history that for some decades had appeared quite settled. The aesthetic trajectories entail changing accounts of the past from the perspective of the present – accounts that open up novel aesthetic, technological and philosophical imaginaries. The effect is the simultaneous production of musical past, present and future: novel constructions of the past in the form of retentions from newly elected forebears are invoked in the process of inventing current practices, in turn

protending previously unimaginable futures. The production of history is employed to generate the 'roots and routes' (Clifford 1997) that substantiate and legitimise emergent musical directions. If Foucault's genealogy points to the analyst's anti-teleological recovery of the multiple, contingent sources of present arrangements (Foucault 1977), then these aesthetic trajectories attest to my interlocutors' own genealogical practices: musicians' curious and impassioned recovery of forgotten or 'minor' figures of twentieth- and twenty-first-century music, in the process reshaping established histories. Notable is the extent to which this creation of new pasts by practitioners runs ahead of academic musicology, which has yet to address certain figures and currents from recent decades that are now actively being recovered.[44]

These aesthetic trajectories feed an efflorescence of novel musical currents in the present, currents that erode the boundaries of existing classifications – music and sound, art and popular, academic and nonacademic, digital and post-digital. Today's music technology practices are taken by my interlocutors to have their sources in a series of heterogeneous aesthetic referents and movements bearing both negative and positive charges. In terms of negative charges they include an indifference towards, and a perception of the aesthetic exhaustion of, the dominant modernist lineage of the post-War European avant-garde, notably, with the exception of Stockhausen, the Darmstadt School (Nono, Boulez, Maderna, Pousseur) and its inheritors, including Lachenmann, Rihm and the proponents of French spectralism.[45] It is this lineage and these figures that appear still to preoccupy some European musicologists of twentieth-century art music.[46] More proximally, a generational divergence within the academy sees younger faculty and students straining to loosen the hold of the academic electroacoustic tradition, acousmatic music, that traces its lineage to Schaeffer and *musique concrète* (Battier 2007): fixed media music generated through digital manipulation of recorded sound materials, with its continuing adherence to concert hall conventions (e.g., Adkins, Scott et al. 2016 ; Waters 2000).[47] It was the post-Schaefferian tradition that gained academic traction from the 1970s in Britain, Europe, Canada and elsewhere, by 1999 drawing the fire of the Prix Ars Electronica jury. For its defenders, the ambivalence shown by younger generations towards acousmatic music is experienced as metonymic of the crisis of Western art music. As one faculty composer put it, ruefully: 'The vast majority of students here come with no connection to the classical tradition … I had this rigorous, rich exposure to the Western musical tradition … [but] it's not what we are able to provide here. I see that as contributing to the slow, painful death of the classical tradition in Western culture … We have more and more islands, especially in upper-end

academia, where we create the illusion that these cultures are alive, but they are really being kept alive by artificial respiration.'

These negative charges are complemented by a profusion of positive charges: a growing awareness, fuelled by incipient critical literatures, of alternative lineages of twentieth-century art music, particularly those associated with expanded palettes of sonic and conceptual materials – among them Russolo, Varèse, Cowell, Harrison, Cage, Partch, Stockhausen and Xenakis, as well as other American and European experimentalists including David Tudor, Morton Feldman, Earle Brown, Christian Wolff, La Monte Young, Pauline Oliveros, Alvin Lucier, Gordon Mumma, Yoko Ono, Nam June Paik, Robert Ashley, James Tenney, Maryanne Amacher, Tony Conrad, Max Neuhaus, Frederic Rzewski, Phill Niblock, Éliane Radigue, Cornelius Cardew, Gavin Bryars and Brian Eno; a rising awareness of the heterodox shores of live experimental electronic art music from the 1960s on, including groups like Musica Elettronica Viva, Sonic Arts Union, AMM, the League of Automatic Composers and the Hub; an embrace of improvisation under the influence of core figures from the free improvised music movements that developed from the 1960s and 70s on (Lewis 1996; Toop 2016); and burgeoning connections to sound installation art, site-specific sound and soundscape composition along with their diverse aesthetic and philosophical entailments, including links to the visual arts and to intermedial practices.[48] At the same time, younger musicians pursue the recovery of diverse experimental currents within rock and popular music, and their escalating influence from the 60s and 70s on, including art rock, krautrock, industrial, punk/postpunk, dub reggae, funk and hip hop, evident in such acts as Zappa, Pink Floyd, Hendrix, Can, Faust, Kraftwerk, Test Department, Throbbing Gristle, King Tubby, Lee 'Scratch' Perry, Cabaret Voltaire, Grandmaster Flash, Sonic Youth, Björk and Radiohead; while also manifesting commitments to the frenetically branching genres and subgenres of electronic dance music that emerged from disco, techno and house in the 80s, along with an awareness of the cross-fertilisation of these lineages, issuing from the 90s in experimental directions within electronica which fuelled the emergence of a series of nonacademic experimental digital musics that aspire to elide the boundaries between art and pop, music and sound – among them noise, glitch, ambient, microsound and IDM – exemplified by artists like Merzbow, Autechre, Aphex Twin and Adrian Sherwood. It is the potential fruits unleashed by the interweaving of these lineages that draws and preoccupies younger generations of musicians associated with the music technology degrees.

The aggregate effect of these interweavings is the generation of multiple ramifying new pasts as they are enrolled in producing singular

aesthetic potentials in the present – fuelling that burgeoning diversity of idioms alluded to at the start of the chapter. Such an intermingling of currents can be seen in the genealogies narrated by musicians when asked about the roots/routes of their music. As examples: Pierre Alexandre Tremblay, a Huddersfield faculty composer, sees his music resulting from a PBR-based merging of studio composition, post-free-jazz improvisation (on laptop and bass guitar), popular music production and digital signal processor (DSP) coding, with the aim of generating an 'embodied post-acousmatic composition' (Tremblay 2012, 3). In turn Mark Fell, when a PhD student at York, cited the influence of Varèse, Stockhausen and English minimalist Andrew Poppy, of 80s synth pop bands Human League, Vicious Pink, Depeche Mode and Heaven 17, of postpunk and industrial bands The Pop Group, Einstürzende Neubauten, Test Department and Fats Comet, of Detroit techno and house artists Derrick May and Chez Damier, of electronica artists Squarepusher and Nightmares on Wax, as well as the sounds associated with the influential labels Mute, Warp, On-U Sound, Line, Mille Plateaux, Raster Noton and Mego.[49]

Teaching pluralism: inside a music technology degree

Having established in the first half of the chapter three constellations of change that, through their mutual interference, provide the conditions for the emergence of the music technology degrees, this second half gets closer to the musical practices unleashed by this concatenation of forces. Zooming in ethnographically on the music technology degrees, I first portray the nature of the pedagogy and how the aesthetic trajectories described enter into the educational experience – how the teaching both responds to and catalyses broader musical shifts. Following this, through examples drawn from fieldwork, I show how certain practices can be seen to embody variants of a logic of ontology, and I elaborate on their critical significance.

The material that follows illuminates various kinds of 'boundary work', a concept coined in the sociology of science to identify the policing of classificatory boundaries between 'science' and 'non-science' (Gieryn 1983). As Bowker and Star put it, 'classifications are powerful technologies … [that] become relatively invisible without losing any of that power, … [sites] of political and ethical work.' Moreover, 'The act of classification is of its nature infrastructural, which means to say that it is both organisational and informational, always embedded in practice' (Bowker and Star 1999, 319–20). Boundary work is often engaged in upholding classifications, evident in rhetorical practices that attribute 'selected

characteristics to the institution of science' while denigrating other 'intellectual activities as "non-science"', thereby shoring up the epistemological authority and institutional resources granted to science (Gieryn 1983, 782). However, if the literature on science dwells on how such practices *reproduce* the 'science'-'non-science' opposition, how 'symbolic boundaries are … used to enforce, maintain [and] normalize' social boundaries (Lamont and Molnár 2002, 186), then the analysis that follows intends to augment this conceptual framework by showing how, in conducive conditions, it is possible for classifications to change – for boundary work to be engaged in *transforming* classificatory boundaries. Art and music are institutional spheres in which, by analogy with science, institutionalised 'artistic classification systems' enforce naturalised boundaries between 'art' and 'non-art' (e.g., craft or design), 'high' and 'low', structuring what is or is not accorded value and legitimacy (Becker 1978; DiMaggio 1987). In the remainder of the chapter I show how, in the music technology degrees and the scenes to which they are linked, longstanding classifications demarcating art from popular music, academic from nonacademic music, and music from sound are being revised, if incrementally, through transformative boundary work that may be aesthetic, epistemological and/or ontological in orientation. I show the nature of such boundary work in ethnographic takes focused on curricula, a textbook, and classroom teaching of electronic music history and composition. Before that, I sketch the character of the students taking the degrees.[50]

A student experience

Who, then, are the students entering the music technology degrees? To convey their musical and educational histories, I offer a composite figure drawn from numerous interviews. Bill, a Masters student, grew up hearing his parents' 60s to 80s pop and rock in the car and on vinyl. He began to learn violin at state school, but 'as soon as I could I switched to guitar. From fourteen to seventeen I was playing in loads of metal bands; skateboarding was really big. That was my life'. He dropped out of school and got into illegal rave culture and psychedelic drugs: 'I'd been making music using computers since I was 14. [From 17] I switched completely to DJ-ing, part of a sound system, heavily involved in the rave scene. In London we'd play acid techno, for the parties in the country it was European-influenced, trancey.' At this time he was into Aphex Twin, Squarepusher, Venetian Snares and 'other weird stuff'. Bill decided to return to education and took a two-year BTEC in music technology at an art college, soon to be absorbed

into a post-1992 university. He enjoyed the course greatly and did well: 'We did everything: recording, mixing, using DAWs [digital audio workstations], sound design and foley and ADR [automated dialogue replacement] for film.' Following the BTEC, Bill was told that a degree at another post-1992 university 'was the best kind of course for me to go on to, but there the focus was on getting a job in the music industry, and I wasn't interested'.

Nonetheless, he applied for this post-1992 degree course and found that, in addition to the production, performance and 'business and enterprise' of music, 'it pushed me in other directions. There were two incredible teachers; one taught courses on "New music and innovation" and "Sound and moving image"; the other taught social aspects of music. They were completely eye-opening: I took modules on poststructuralism, critical theory and more experimental forms of music.' In these ways Bill encountered Stockhausen, Xenakis and Japanese noise along with Foucault, Lyotard, Baudrillard and David Toop – awakening a fascination for ideas. 'What they showed us sent me on a journey. I started looking deeply into Stockhausen and Xenakis. We had to do an improvised performance; that's when I got back into guitar. I was using turntables and a mixer looping back into itself to create feedback, and audiovisuals projected on a screen. I played in ensembles, including noise ensembles.' When asked, 'Why do you think your ears were suddenly able to take in these new directions?', Bill replied, 'Because by that time I'd got into IDM – Vladislav Delay, Ryoji Ikeda – so it made sense already, given that electronic aesthetic. It opened new things up for me in very unexpected ways.' Effectively, Bill and other students heard Stockhausen and Xenakis as forebears of IDM – as *protending* the later aesthetics and genres.

Curricula

The Masters and undergraduate music technology curricula followed by students like Bill, whatever their musical interests, have a core framework of courses that instil the basic scientific, technological and practical aspects of computer music. In comparison, teaching on musical and aesthetic matters tends, with exceptions, to be relatively secondary. Core courses focus, inter alia, on some combination of audio engineering, studio and recording technologies and techniques, music platforms and programming languages, the 'science of sound' – acoustics, psychoacoustics and at higher levels computational acoustics – sound synthesis, sound design, technologically-mediated performance and interaction design, the latter popularised by the annual New Interfaces for Musical Expression (NIME) conference.

Electroacoustic composition courses include such topics as *musique concrète*, musical and spectral space, the 'architecture of music', reuse and recontextualisation, harmony, colour, network music, and the voice. Performance modules are likely to contain teaching on improvisation and musical collaboration. Electronic music histories invariably focus on exposure to Schaeffer and the GRM, Stockhausen and *elektronische Musik,* as well as twentieth-century experimental music traditions, notably Cage and minimalisms – although, as will become clear, alternative lineages also enter the classroom. More rarely, aspects of sound art may be introduced: sound walks and sound maps, sound installations and environmental sound practices. The effect of the core framework, compounded by the PBR requirements of Masters and PhD studies and incentives like scholarships, grant funding and employability, is to encourage science- and technology-related topics and thus a particular type of interdisciplinarity, a logic of innovation, even among those students aiming to compose. Yet despite experiencing these pressures keenly, some graduate students resist them, choosing to work with alternative intellectual or artistic ambitions to the fore. Indeed, whatever the limits of the curricula, I found graduate students insistently enlarging the aesthetic and conceptual territories with which their work engaged, in part through openings created by their extensive internet-fuelled peer networks, spilling out beyond academia.

A textbook

An indicative source of these alternative aesthetic and conceptual territories, emblematic of the reshaping of recent music history, and forging one controversial route through the heterodox aesthetic trajectories outlined earlier, is a collection published in 2004: *Audio Culture: Readings in Modern Music,* edited by Christoph Cox and Daniel Warner. Used in both undergraduate and graduate courses, *Audio Culture* could often be found lying open and well thumbed around the teaching suites. Through selected writings it lays out a programme that mixes theory and practice, spanning 'noise, sound, silence' from Russolo and Cowell to R. Murray Schafer and Merzbow, minimalisms from Steve Reich and Tony Conrad to techno and house, improvised music from Ornette Coleman and Frederic Rzewski to Derek Bailey, the concept of the open work from Cage and Umberto Eco to John Zorn and Anthony Braxton, as well as electronica and DJ culture. Lauded by such organs as *Leonardo, The Wire*, *Radical Philosophy* and art magazine *Frieze*, the musical and intellectual ambit of the volume is remarkable, as is its irreverence towards divisions between acoustic and electronic music, music and sound. Striking, too, is its insouciance in

traversing the art-pop boundary when compared to recent computer music textbooks, in which, as with 'most scholarly histories of twentieth-century music', popular music tends 'to occupy a supplemental or marginal position' (Clarke 2018, 413). Symptomatically, in one such computer music textbook containing twenty-six chapters, just one chapter is given the responsibility of introducing sound art from Cage and Maryanne Amacher to Christina Kubisch, as well as electronic popular musics from dub and Holger Czukay to glitch.[51]

To convey the substance of the teaching of electronic music history and composition, I move now inside the classroom, where occasional experiments are taking place: the weaving of explicit two-way connections between art and popular music and music and sound, boundary work that knowingly reshapes both the substance of and the relations between these naturalised, long-institutionalised categories.

Two-way crossovers: teaching electronic music history

> *2 March 2012.* The reading for this history lecture focuses on analogue synthesisers, notably the RCA Mark II of the Columbia-Princeton Electronic Music Center, the first programmable synthesiser. Tom, the lecturer, opens that 1966 was the year when analogue synthesisers became more available; by 1969 the Moog synthesiser is used in *Abbey Road*, the Beatles' final studio album, on 'I Want You (She's So Heavy)'. He says, 'The track has a classic rock line-up at the opening, and develops through repetition a mantra-like rock riff, a crazy evocation of desire, accompanied by a gradual swelling of synth-based white noise.' He plays the track and likens the riff to a passacaglia, pointing out that, unusually, it has 10 beats. Tom makes a lateral shift to Steve Reich's *It's Gonna Rain* from 1965: 'One of the key influences that moved from popular music in this period into what would soon come to be called minimalism is extreme repetition – though repetition is also, of course, a feature of tape loops.' He plays the Reich, with its 'extreme looping of an ambient recording', a clip of the intoning voice of a Pentecostal preacher; some of the students know the track and start to move to it. Through repetition, Tom comments, 'we stop hearing this as a voice, with words and meaning, and instead hear it as sound, noticing minute shifts of pitch, articulation and so on'. By 1974, he adds, Reich's *Music for Mallet Instruments, Voices and Organ* used mainly acoustic instruments and voice, 'but the central place of repetition remains, and the musical layers going on at very different

speeds come straight from tape music as an idiom. Reich claimed to be influenced by Pérotin and medieval polyphony, the idea of a cantus firmus, as well as by the pedal points of early Baroque music.' He concludes, 'This is a fine example of how all kinds of influence can enter into music from any period and any place.'

Tom continues the theme by relating how ambient band The Orb sampled Reich's 1987 *Electronic Counterpoint*, written for jazz guitarist Pat Metheny, on their 1990 track 'Little Fluffy Clouds', initially without letting Reich know. 'This was the Golden Age of sampling!' he adds with irony masquerading as nostalgia. He plays the track by The Orb: suddenly the room gets animated; several male students turn and play air guitar to each other. 'So that's another example of direct contact between rock and minimalism – but now in the reverse direction'. Tom shifts laterally again to Glenn Branca's massed electric guitar orchestra and plays his 1983 *Symphony No. 3* a static, drone-like piece built on microtonality and elements of the harmonic series. 'Branca lived in Soho, New York, where the experimental downtown music scene and experimental rock often overlapped'; in his band were guitarists Thurston Moore and Lee Ranaldo, later of Sonic Youth, and Michael Gira of noise band Swans. Tom jumps to a later Branca piece with a four-square rock feel, characterising Branca's sound as 'contemporary classical fused with elements of rock'. He goes on to play 'Silver Rocket' from Sonic Youth's 1988 double album *Daydream Nation*, commenting that 'here, some of the conventions of rock are fused with elements of the experimental downtown scene – improvisation, exploration of timbre, and at times a total breakdown of metric structure. Sonic Youth got really interested in nonstandard guitar tunings, which they learned partly from Branca.' Continuing the electric guitar theme, he segues into discussion of Charles Kronengold's analysis of the different generic functions of guitar solos in album-oriented rock, disco and new wave,[52] noting how in Sonic Youth and much of new wave, the guitar solo moves beyond even the ironic stance of punk into pure texture and sound – and is therefore, he implies, closer to experimental music.

Listening beyond categories: a composition class

5 April 2012. The class this week is on mixing. Steve says he's going to play the students three pieces that employ mixing in very

different ways. The first is a techno track from *Analogue Bubblebath IV* (1994) by AFX (or Aphex Twin).[53] 'What stood out?' He's trying to get them to think analytically and aesthetically about the track, and encourages them to focus on where it lies spectrally. 'There's a lot of midrange. One place it's very compressed is in the dynamic range: for example, the organ enters the mix very surreptitiously and then he brings it right up in the mix. It's also about layers: the bass-drum beat is so insistent and continuous that when it's taken away, suddenly there's a big space created, so change in the mix is really propulsive.' A student, Brian, comments on the kind of time created by continuous repetition as a build-up. Steve responds, 'Yes, at the heart of techno is 4/4; phrase-wise it's very blocked out. But with Aphex, he's bafflingly unpredictable: he'll keep up a particular repetitive groove for longer than expected or much shorter – that's unusual for techno. There's a sparseness: you get no pitch or melody for quite a time; something insistent comes in that's in the region of a high-hat sound but isn't one – so it's compelling. The opening bass drum-like sound: be aware how articulated this one drum sound is!' Steve plays the sound again: 'He's working with volume, adding reverb; so it's not exactly irony, but he's doing really interesting things with even this most elemental sound.' Another student, Ashok, picks this up: 'Yes, what he seems to be doing is taking the TB-303 standard sound and making it quite different – so it does have the quality of being ironic, a comment.' Now Steve points to periodicity in the track: the opening bass-drum sound has a single beat insistence; then another sound comes in and spans a four-bar period; this coexists with several one-bar periodicities – and all of this is percussive. He continues, 'It's ascetic, a grey palette, squeezing the maximum out of it musically; and that's because techno is inherently a combinatorial form made of lots of small periodic elements but with no overarching form, no building to an arc or a resolution. The melody comes in through tiny glimpses, then nothing for another few bars; then he clears space by dropping out some texture before bringing the melody back in so it becomes focal. This happens in a lot of groove-based music: when he brings in melody, he does it kind of sideways, so when it comes in more fully it forces you to encounter it differently. That's why mixing and form are intimately related.'

Steve plays a passage where there's a sudden dropout, a surge-like effect. 'That's a really effective use of negative space! The

last two beats of melody and midrange in the bar just drop away and only the bass drum remains. Aphex designed this: he's doing very subtle counterpoint with incredible confidence. What do I mean by negative space? He's cutting things away in order to let things breathe.' Steve takes us to another section: here, 'Aphex takes away different parts of the spectrum using a filter, and manipulating a filter is a physical thing, part of the craft – to do it you have to grow your listening.' He takes us to the ending: 'Almost the whole piece is anti-pitch, percussive and sonic. But notice how the very last figure has totally new tonal material on the organ, a disturbing clash between a major and minor third, and it's off the beat – drunk, dissonant, a completely different soundworld. Then the piece ends with a sudden cut-off, mid melody.' But in fact this 'totally new' material is foreshadowed earlier, 'so on repeated listening you hear this pre-echo. That's why repeated listening is repaid with this piece. It's these tiny elements counterposed with the machinic feel that give real expressivity. Throughout, your sense of time is constantly being expanded and then compressed, and it keeps you on edge. This is genius, unobvious mixing …'

The second piece Steve introduces is Christopher Penrose's *Manwich* (1993). It's a more narrative, *concrète*-like piece, with referential sounds: snatches of film and TV soundtracks, and then some very articulated creaking sounds – perhaps a door or chair. Steve comments on the rich, reverberant concrete sounds employed and then on the deliberate juxtaposition between these two sound worlds, which is vaguely disturbing. It's an almost sarcastic way of mixing, with the effect of commenting aurally on the film music interlude. The students join in; by now Steve has cultivated close listening and a critical vocabulary. He says, 'So one of the ways to develop your thoughts about what a piece is doing is to ask: where is the affect going?' The piece becomes more surreal, yet is still referential: another characteristic mixing device. Steve sums up: 'So this is classic early 90s computer music, all about how to deal with sampling and mixing when anything is possible and everything is available.'

Finally, Steve plays Paul Lansky's *Ride* (2000) 'based on recordings of cars outside Lansky's house. You hear lots of Doppler effects, and the opening has one of the best crescendos in computer music!' Aesthetically, he notes, this piece is more in the lineage of the 'Schaefferian sound object' than the previous two. It's harmonic and pitch-oriented, with 'gestures', swelling sounds, held chords and vibraphone- and marimba-like passages. The students are less

attentive, fidgety. Steve draws out another aesthetic strategy central to this piece: 'the computer as microscope, allowing you to zoom in, get close up inside the sounds; in fact the car sounds are tuned to harmonic material, and the apparently acoustic instrumental sounds are simulated. A key Lansky effect is to take the swelling and dying away of the car sounds and apply this envelope to the rest of the material.' Steve links our experience of the piece to Schaeffer's idea of reduced listening: 'After a while, we don't hear the car sounds as that but as sonic material that draws us in, an "objet sonore" abstracted from its origins. A student of Lansky's called it "*Götterdämmerung* on wheels!".'

In sum, what we witness in these teaching scenes is boundary work elaborated through musical examples and commentaries, work that puts aesthetic and epistemological pressure on established classificatory oppositions: music and sound, art and popular, academic and nonacademic music. Through this work boundaries are reshaped and reorganised: what previously lay 'outside' and unrecognised in the academic pedagogy and history of electronic music is relocated so as to be 'inside' and valorisable; what were oppositions are transformed into mere assimilable differences, differences that are shown to be ripe with productive new musical and epistemological alignments. At the same time, implicit social boundaries aligned with the former categories are also being reshaped, with the potential to bring students and faculty into a newly configured musical and social universe of mutual recognition. What is being set in motion, then, is a form of musical-and-social pluralism.

Musical practices – ontological experiments

In the final section of this chapter, I expound on the heterogeneous musical practices engaged in by my interlocutors: graduate students, faculty and musicians encountered in the music technology centres and related networks. The practices that follow are all interdisciplinary, and in portraying them I refer to the three logics of interdisciplinarity outlined earlier (pp. 318–19), showing how, in diverse ways, the logics of innovation, accountability and ontology inform these practices and may be interwoven. The spotlight, however, is on the logic of ontology, and I propose that among these interdisciplinary practices are myriad expressions of this logic, each challenging the ontology of Western art

music, of academic electroacoustic music and, more pointedly, of acousmatic music. That music today stages an array of experiments in alternative ontologies of music is recognised in wider discussions of contemporary music and the expanded field or post-medium condition,[54] the new conceptualism or new discipline.[55] Such experiments are often traced back to Cage and his associates, for example La Monte Young, whose *Compositions 1960* embody 'a hypothesis about the ontology of music', questioning 'how, where, and in what form can music exist' (Grimshaw 2011, 52). Less clarified are the labile relations between such ontological assays and politics. In what follows I suggest that there is a politics immanent in those interdisciplinary practices that, challenging music's reigning ontologies, embody a logic of ontology, that it takes multiple forms, and that in some interdisciplinary practices it is not explicit or recognised as a politics, while in others it is strongly, consciously enunciated as a politics. Thus, the nature and the degree of politicisation of the practices, of their reflexive formulation *as* a politics, varies greatly.[56]

Four species of the logic of ontology can be identified in the practices that follow.[57] The four are nonexclusive and often combined. They are: a (re)turn to humanly-mediated live performance; a focus on performance space, site or situation; social or ethical orientations; and technological and materialist *détournements*. All four react against and attempt to transcend the limits of academic electroacoustic art music while building on and elaborating alternative aesthetic genealogies: those earlier practices outlined in the previous section that are actively being recovered and retained. In all four, digital and analogue technologies play formative parts, and all four combine creative practices with theoretical reflection, as necessitated by PBR and interdisciplinarity agendas, academic job markets and grant applications. The practices thereby recapitulate two features of earlier modernisms – theoreticism and the embrace of new technologies (Born 1995, 41–2) – albeit in more and less instrumental ways.

Of the foundational classificatory dualisms identified at the start of this chapter, two of them – music and sound, digital and post-digital – are particularly salient to these ontological experiments. Since the work of Russolo, Varèse, Cage and Schaeffer the relationship between music and sound has been a heightened one, culminating in recent years in the coining of the term 'sound art' and its anachronistic retro-application (Licht 2007, 8–12). In David Toop's equitable rendition, it is sound art's multiple challenges to music's reigning ontologies that are to the fore: 'The rise of sound art … has contributed to a blurring of lines between all the elements that constitute music: its possible settings, durations, forms, presences, and materials … While threatening to homogenize activities

that may be at opposite ends of the spectrum, this view of music as a field of relatable *workings with sound and listening* has been internalized as a basic condition of much twenty-first-century music' (Toop 2018, 448).

Yet controversies abound. On the one hand are pleas for sound art to become ascendant, to access 'the funding, the sponsorship and the publicity' granted to classical music, and to be lifted out of its segregation among the visual arts so as to subsume music itself within a continuum in which 'any work with sound becomes a sound work becomes sound art' (Gardner and Voegelin 2016, 16, 18). On the other hand are those writers who question sound art's apparent regressive return to an essentialist medium specificity: 'Even in its most "expansive" forms, sound art proceeds … from sound as an artistic category.' In this light, 'music [should] become untethered from sound', reconceived as 'a critical art practice [no] longer adherent to the primacy of sound, [a] "music beyond sound"' (Barrett 2016, 5–6). However adversarial, these opposed views converge on the crucial ontological significance of the relation between music and sound; while a further debate over the 'ontological turn' in sound studies pits a universalising metaphysics of sound 'as an asignifying, material flux' (Cox 2011, 157) against calls for historically nuanced analyses of 'auditory culture, audile techniques, and the technological mediation of sound' (Kane 2015, 3).[58] Questions of ontology turning on the relation between music and sound are, then, live and contentious.

The couplet digital–post-digital is less theoretically developed. Nonetheless, the concept of the post-digital haunts contemporary practices through a troubling of digital 'perfection' and a (re)turn to pre- and non-digital, mechanical and analogue components and circuitry. Two politicised uses of the term can be discerned: the first was coined by Kim Cascone in the context of glitch laptop aesthetics in nonacademic electronic music, the second by the artist Ian Andrews, for whom post-digital aesthetics entail a rejection of teleological ideologies of 'digital progress' (Andrews 2000, 1; Cramer 2015). Cascone roots his genealogy of post-digital music in Russolo's *intonarumori* and Cage's embrace of background noise: 'it is from the "failure" of digital technology that this new work has emerged: glitches, bugs, application errors, system crashes, clipping, aliasing, distortion' have become composers' raw materials (Cascone 2000, 13). Andrews' stance leads towards DIY practices hybridising digital technologies with 'junkshop equipment' (Haworth 2013, 187), multitrack tape recorders, cheap analogue synthesisers, keyboards and effects pedals, vinyl records and audio cassettes – a focus 'less on content and more on pure materiality' (Cramer 2015, 22). Post-digital captures, then, the 'paradoxical condition of art and media after

digital technology', querying the boundary between 'old' and 'new' media, and promoting 'DIY agency outside totalitarian innovation ideology [and] big data capitalism' (Andersen, Cox et al. 2014).

The tension playing out in the digital–post-digital debate between a 'totalitarian' logic of innovation and a critical material sensibility was prefigured in the mid-twentieth century. Cage's works and writings foresaw a radical expansion of musical materials through an openness to 'the entire field of sound', to be drawn from the environment or created using 'oscillators, turntables, generators, means for amplifying small sounds, film phonographs, etc.' (Cage 1983 [1937]). Cage's vision of technologically-enhanced, sound-based composition, particularly as it was later developed by David Tudor, set the terms for the emergence of a logic of ontology in music. Yet by the late 1950s this was not the only kind of incipient music-technology interdisciplinarity: it was paralleled by a scientistic tendency akin to a logic of innovation. For William Brooks, the two tendencies characterise experimental music writ large, and he locates their wellspring in the palpable differences in this era between Cage's chance-based experimentalism and Lejaren Hiller's scientific, algorithmically-inclined compositional work with the ILLIAC computer (Brooks 2012). The two can be seen to augur a continuing spectrum of positions between those music technology practices oriented more to a logic of ontology (Cage) or to a logic of innovation (Hiller).

In the 1960s the two tendencies recur in differences between Tudor's later electronic practices and those of the Bell Laboratories-linked group Experiments in Art and Technology (E.A.T., in which Tudor was himself involved). As Frances Dyson percipiently comments on E.A.T., 'Billy Klüver's suggestion that artists' involvement with technology would stimulate innovation … [raised] the question of artists' usefulness and value within a corporate context and, more importantly, in relation to the progress of "technology" per se' (Dyson 2004, 1). In turn, Tudor's practices from the late 60s diverge both from E.A.T.'s corporate-friendly programme and from his own performance ethic of 'fidelity to a composer's intentions' (Kuivila 2004, 17). As a pianist Tudor generated 'a performance score from measurements of the original score, precise calculation, and conversion tables' (Piekut 2011, 56). But his performance of Cage's *Variations II* (1966) yielded a new experience: 'an extremely complex system of feedback loops and resonances in which tiny changes in the system could potentially lead to large-scale, unstable effects' (Salter 2010, 195). Within a few years Tudor began to build self-generating sound environments, working 'against the grain' by taking any technological paradigm or device and inverting its terms – for example,

treating inputs as outputs or vice versa (Kuivila 2004, 20). Hence, the piece composed itself, emerging 'out of the tuned space of objects and overlapping social activity', with sounds requiring amplification 'activated by other small sounds rather than by the performer's physical manipulation of an object' (2004, 21). Tudor noted of such a system, 'I want to show it as something in nature' (quoted in Kuivila 2004, 20). If not ostensibly 'political or social' (cf. Piekut 2011, 166), Tudor's later practices broke with his persona as the Ur-performer of Cage, Stockhausen and Wolff through a logic of ontology in which the nature of musical subject (composer, performer), object (musical work) and their relations were radically altered. Music emerges as a type of materialist vitalism, a self-generating assemblage of sounding entities, with a politics immanent in this novel ontology. Tudor's practices and collaborations with Pauline Oliveros (Oliveros 2008) became a model for a 'counterculture' involving Lucier, Mumma, Berhman and others (Cox 2012, 171). It is this lineage in combination with related genealogies of instrument building (Nelson 1991, Toop 2013), circuit bending (Ghazala 2005) and hardware hacking (Collins 2006) that fuel certain post-digital, materialist incarnations of a logic of ontology manifest in today's practices of music-technological *détournement*: the fourth species that I discuss below.

Four species of the logic of ontology

To recap, the genre against which the musicians I have researched define their practices, but on which some of them also draw, is academic electroacoustic art music and in particular acousmatic music, enshrined as a core aesthetic and discipline in many British music technology degrees. This is a music descended from Schaeffer's *musique concrète* (Peignot 1960; Schaeffer 1966), made of recorded 'real world' and/or synthesised sounds, and associated with aesthetic exploration of timbre, sound shapes and 'gestures', narrative form, and the spatialisation of sound. It is experienced via playback through loudspeakers in concert halls, largely without the mediation of human performers,[59] by silent, still and contemplative audiences. A key debate around the genre since the Schaeffer generation has focused on the degree of abstraction from 'source' or, on the contrary, the referential meaning of the component sounds (Demers 2010; Emmerson 1986; Kane 2014). Although positions vary, in recent years such sounds are generally taken to have both intrinsic and extrinsic referents, propelling a focus both on 'spectromorphology', how sound spectra change and are shaped over time (Smalley 1997,

107), and on semiosis and narrative. The ontology of acousmatic music therefore encompasses a dialectic between sonic formalism and representationalism, the concert hall settings and audience conventions of Western art music, and an absence of live human performance. But the abstraction-referential dialectic obscures another absence: 'a phantasmagoric lack of consideration for the means of production' (Kane 2014, 126). Indeed, both music's materiality and its social dimensions are backgrounded in acousmatic music; this is an ontology that, like that of Western art music, 'denies or marginalises music's social and material mediation' (Born 2013, 142). The denial of material mediation is elevated to an aesthetic principle by composer-theorist Denis Smalley: 'We must try to ignore the … computer technology used in the music's making' or risk a 'listening mode which I call *technological listening.* [This] occurs when a listener "perceives" the technology … behind the music rather than the music itself' (Smalley 1997, 108–9). In what follows, I show that each element of the ontology of acousmatic music is problematised in the four species of the logic of ontology that I encountered through my interlocutors, which together sketch a *tour d'horizon* of current directions.

First species: a (re)turn to humanly-mediated live performance

The first departure from the ontology of academic electroacoustic music involves a (re)turn to humanly-mediated live performance, such that music is emergent from the performance event, against its reduction to the playing-out through speaker systems of prerecorded tracks. The elevation of performance subsumes further core directions: an embrace of interactivity, of improvisation, of intermediality, of real-time processes, and of embodiment, these elements differently mixed in recent practices. At the low-tech end, live coding, as taught at Huddersfield, involves ambiguous, even ironic commitments to transparency, competitiveness and play in the form of laptop-based improvisations that display real-time screen projections of programming-based sound production in process (Roberts and Wakefield 2018).[60] At the high-tech end, two genres manifest a logic of innovation. In biomusic, in a direct line of descent from Lucier's *Music for Solo Performer* (1965), interactivity, embodiment and real-time processes come to the fore. Physiological signals captured by sensors worn on the human body are used to generate or modulate sound in performance. This can take the form of 'amplifying and processing the acoustic sound of a performer's muscle contractions' (Donnarumma 2012, 1),[61] or, in SARC's Biomuse Trio, of tracking emotional arousal through ECG and

EEG readings drawn from a 'biomusician'. Trio performances entail 'a seamless line from muscle to skin, to sensor, to EyesWeb, to Max, to digital audio, to speakers, and in a converging line from violin to microphone, to analogue-to-digital converters, to Max, … to the biomusician's body again.' The trio's violinist 'tosses' sound to the biomusician, which s/he then 'sculpts' as if 'pulling sounds from the violin' (Lyon, Knapp et al. 2014, 73).[62] Demanding the creation of novel hardware and software, this PBR project marries 'computer chamber music integrating biosignals' (2014, 64) to scientific method, with the aim that 'the ability to accurately recreate our performances [serves] as a test of the reliability and stability of our system' (2014, 66).

In telematic or network music, the focus of several PBR projects at SARC, Belfast, the internet becomes a 'new medium for performance' (Rebelo 2009, 387). Based on live audio and video streaming between geographically distant locales, the genre requires the development of real-time communication infrastructures and the solution of complex latency problems. Such an infrastructure supports a kind of musical 'action at a distance' (Rohrhuber 2007, 143): real-time collaborations between improvising or score-following musicians in each locale. While the genre's technical ambitions enact a logic of innovation, it can also exhibit conceptual heft, evident in Pedro Rebelo's contention that network performance enables 'a re-think of traditional relationships between musicians, audiences and spaces' (Renaud and Rebelo 2006, 5), enabling him to compose non-hierarchical network music topologies after the model of the rhizome (Rebelo 2009, 388; cf. Deleuze and Guattari 1987). Such a 'distributed dramaturgy' problematises existing norms, posing questions like: 'Can we conceive of music that sounds differently depending on the nature of participation? What are the formal implications for music that … is "entered" at different times, from different places?' (Rebelo 2009, 392). Network music projects by SARC PhD students connect performing ensembles in Belfast with others in Stanford, IRCAM or Graz, sometimes guided by real-time visualisations, or game-like rules, or working purposefully and theatrically with *mis*communication between remote groups. In Felipe Hickmann's *A Man, A Mark, Amen* (2010), 'shifting network topologies … deliberately cut and re-establish audio links between sites' during performance. 'Two venues feature instrumental ensembles whose performance is affected by the discontinuous nature of musical inputs received from remote players. The piece also builds on levels of asymmetry between the constantly disturbed audio connections and the visual rendition of dislocated players' (Hickmann 2013, 27).[63]

In fact, conceptually-oriented network music long predates the digital. Immanent in the practice are genealogies that, through retentions, are recovered and reanimated. In Neuhaus' 1966 'broadcast work' *Public Supply I*, audience members were invited to phone in to New York's WBAI radio station, where their contributions were 'mixed, merged, and broadcast over the airwaves. A performance architecture emerged' (Renwick 2017, 60), a 'virtual space which any of the ten million people living [in the region] could enter into by dialing a telephone number, (Neuhaus 1994, 7). In Amacher's 1967 *City-Links #1 (Buffalo)*, the first in a series of 'long-distance music' performance events, environmental sounds from eight locations were transmitted over high-bandwidth phone lines to Buffalo's WBFO FM, where Amacher mixed them into a 28-hour radio broadcast: 'a meditation on social location and "high-tech" embodiment and "geometries of difference"' (Cimini 2017, 95). Comparing the earlier works with academic network music today, it is striking that the latter's high-tech orientation risks elevating innovation over ontological ambition; the vernacular material sensibilities, sonic-environmental and democratic sociotechnical features of the earlier works have been attenuated.

A different conceptual performance paradigm rejects 'command and control' approaches to interface design and 'standard ontologies of live electronic systems' (Green 2014, 62) in favour of ideas of 'audible ecosystem' or 'performance ecosystem' (Di Scipio 2003; Waters 2007). In a critique of the 'innovation' telos and positivist methodologies of human-computer interaction research (Norman 2013), interface design becomes 'the very object of composition … and the array of DSP algorithms, and the methods by which they communicate among themselves, [are] the material implementation of a compositional process' (Di Scipio 2003, 270). Incubated in the UK at UEA and Edinburgh, this 'heretical' PBR retains the work of Tudor, Lucier, Xenakis and Herbert Brün along with philosophical ideas of self-organisation, autopoiesis, emergence and complex dynamic systems drawn from cybernetic and ecological writings by Von Bertalanffy, Maturana and Varela, Gibson, Ingold, Artificial Life theorist Peter Cariani and others. Agostino Di Scipio's work is exemplary, criticising the cybernetics of Xenakis and Brün for advocating homeostasis, for lacking the capacity for an algorithm to change its own behaviour, and for portraying 'a closed system … [with] no feedback from external conditions'. Instead, Di Scipio proposes an audible ecosystem 'in continual exchange with the surroundings and with its own history' (Di Scipio 2002, 25).[64] In this process materialism, performance sets in motion feedback systems between machine, human and environment, and musical activity spreads out from 'text, or software, to become enmeshed

in further flung social and material networks' (Green 2014, 60, 62). As opposed to the 'biopolitics of music', how music is rendered an object of 'political and economic powers through scientifically-based technologies of sound control and treatment' (Di Scipio 2015, 281), the audible ecosystem enacts a logic of ontology in which nonhuman, human and environment collaborate in live, self-organising performance processes that overdetermine the aesthetic.

Second species: a focus on performance space, site or situation

A second species of the logic of ontology focuses on performance space, site or situation. Abandoning the concert hall settings and conventions of academic electroacoustic music and Western art music, it retains the burgeoning lineages of sound art, public art and locative art and their novel constructions of site, space and mobility (Behrendt 2010). Among them are R. Murray Schafer's acoustic ecology; the soundscape and field recording practices of Luc Ferrari, Hildegard Westerkamp and Barry Truax as they inform environmental sound art and 'context-based composition' (Truax 2017); the naturalist tradition of field recording initiated by Ludwig Koch and others; site-specific and sound installation art, often mixed with visual and performance art and sourced to Yoko Ono, Max Neuhaus and others (Ouzounian 2008); and mobile sound art as pioneered by Christina Kubisch, Teri Rueb, Janet Cardiff and others. Influenced by such theorists as Henri Lefebvre (Lefebvre 1991), Michel de Certeau (de Certeau 1984) and Doreen Massey (Massey 2005), these sound artists invariably reject Euclidean conceptions of space, experimenting with listeners' relational experiences of sound, space and place (LaBelle 2006; Born 2013).[65]

Given the pull exerted by the resources of the university, such experiments may once again manifest a logic of innovation. Designed for the MUMUTH hall in Graz's University of Music and Performing Arts, and utilising its system of 64 wall-hung, 36 ceiling-mounted and 33 'flying' loudspeakers controlled by 99 configurable parameters, Gerhard Eckel's artistic research project *Zeitraum* (2013) is a sound installation 'exploring the interrelation of time and space'.[66] Based on case studies in 'choreographing' sound in this unique site, *Zeitraum* dramatises the poverty of the normative scientific paradigm for sound spatialisation in room acoustics: the 'sweet spot', the location in any room at which all sound wave fronts arrive simultaneously, supposedly affording the ideal listening experience. Interweaving the logics of innovation and ontology, *Zeitraum* enacts alternatives, inducing audience-participants to explore how it is

their own embodied movement through the space that creates subtle changes in the rhythmic pulses broadcast across multiple speakers. Moving bodies, speakers and room together engage in modulating the pulses, from regularity to halting irregularities, coproducing aesthetic experience and embodied knowledge – and recalling the experience of movement through the 'sonic topography' of Young and Zazeela's *Dream House* (Grimshaw 2011, 139–41). Against the objectivist account of acoustic space crystallised in the sweet spot, *Zeitraum* enlivens a relational sound event.[67]

Exemplifying the move in site-specific and locative sound art outside the concert hall, the PBR works of SARC's then PhD students Matt Green and Rui Chaves exhibit different tendencies. Green's PhD centred on site-specific compositions responsive to 'a specific social and environmental context [and its] cultural, historic and political significance',[68] exploring how pervasive and mobile sound technologies can transform the experience of ordinary urban spaces. The PhD was partly funded by Hewlett Packard and employed their Mscape software, which allows sounds to be triggered in specific locations via GPS-enabled phones. Green sees his practice as retaining the work of Rueb, Cardiff, Neuhaus, Bill Fontana and Duncan Speakman, putting this in dialogue with Michael Bull's account of how iPod users create psychological distance from the urban environment through its aestheticisation (Bull 2010). To counteract such distancing Green draws on Debord's idea of the *dérive*, experimental movement through the city's 'varied ambiances' to reveal the terrain anew and stimulate its reappropriation. In Green's sound walk 'In Hear, Out There: Madrid', sounds are 'layered' on to a residential district of Madrid, the site of a regeneration plan for the construction of a new opera house, public library and botanic garden. In the event, none of these amenities were built, leaving a desolate commercial area and a gang-friendly park. The sound walk evokes 'what might have been' through the virtual sonic presence of three of Madrid's emblematic cultural landmarks: Teatro Real, Biblioteca Nacional and Real Jardín Botánico.[69] In this way it conjures ghostly sonic echoes of the never-built amenities, stimulating participants to imagine the place differently and engage in a politics of 'what might yet be'.

Chaves' PBR works, in contrast, add reflexive conceptual and intermedial dimensions to field recording as a practice, disrupting any putative objectivity attributable to such recordings as well as their mere aestheticisation. Instead, Chaves explores the performative nature of recording practice along with the technological and embodied mediation of resulting sounds. Citing performance theory and Krauss' 'post-medium condition', Chaves decries 'latent modernist discourses' that portray sound as an autonomous object in favour of practices 'in which the

experience of sound is contaminated by gesture, text, technology and place' (Chaves 2013, 40–41). Place, in turn, is reconceived via such theorists as Casey (1996) and Kwon (2004) such that 'the relationship between participant and "site" [is rendered] dynamic, embodied and experiential' (2013, 37). Chaves' long-duration environmental audiovisual work 'Chasing ∞', a collaboration with Matilde Meireles, highlights procedures of framing and contextualisation, abandoning any 'mythological hidden perspective' (2013, 163). The film is an intervention that charts temporal shifts in 'light, tides and atmospheric conditions [as well as] the movement of my body, my interaction with the guitar and wind' (2013, 168). In the film Chaves stands on a beach holding the body of an electric guitar as its strings are strummed by the wind, so that 'the unpredictable force of the wind creates a stochastic process that ultimately determines the sonic process'.[70]

Third species: social or ethical orientations

A third species of the logic of ontology takes social or ethical orientations, transforming two foundational components of the ontology of acousmatic and Western art music: composer-subject and musical work. This is manifest in strenuous reworkings and redistributions both of the creative subject and of the work as event, practice or process. Interweaving the logics of accountability and ontology, these practices animate diverse experiments in anti-hierarchical participation or collaboration – between musicians, between musicians and audiences, or between nonhuman and human participants – and apply them to ethical, political or scientific ends. Through distributed creativity (Clarke and Doffman 2017), the creative subject is rendered multiple and the musical division of labour fluid. The third species, too, has precursors, retaining aspects of Cage's *4'33"*, of improvised and participatory experimental music since the 1960s, and of post-conceptual art, notably relational aesthetics (Bourriaud 2002), 'participation' (Bishop 2006) and 'living as form' (Thompson 2012).

These orientations are evident in *Sounds of the City*, a participatory sonic-social research project allied to wider social and political purposes developed in 2012 by SARC's Rebelo, Meireles and Chaves, and anthropologist Aonghus McEvoy, and curated by Rebelo. Based on community workshops that introduced field recording and listening techniques to young and elderly Belfast residents, the project invited participants to reflect sonically on their relationship to the city's troubled history. Encouraging a crossing of intergenerational, political and religious divides, the project leveraged the participatory microsocialities

of sound art practice towards post-conflict reconciliation. The resulting audiovisual installations, exploring 'the relationship between sound and memory, sound and place, and the documentation of everyday personal auditory experience', were presented in a gallery.[71] As Gascia Ouzounian eloquently affirms, the project intervened in several ways: 'by inviting people to document and observe [Belfast's] changing soundscape …; by performing acts of historical recovery; by communicating the experiences of marginalized communities …; [and] by providing opportunities for people to form new relationships to everyday sites through creative acts of listening' (Ouzounian 2013, 54).

A second edition of *Sounds of the City* in Rio de Janeiro in 2014, *Som da Maré*, involved residents of the Maré favelas, recent sites of insurrectionary activism and army occupation. In this incarnation, the project added into the mix participatory methodologies retained from the Brazilian lineages of Paolo Freire and Augusto Boal (Freire 1970; Boal 2000), creating a dialogical process in which all parties together build new 'politico-epistemological foundations' (Rebelo and Velloso 2018, 142). Using reflexive ethnography, *Som da Maré* forged an 'extended network of complicity' between favela residents, SARC sound artists, the Brazilian ethnomusicological research group Musicultura, and the local Museu da Maré and Maré theatre group Cia Marginal. The project sought to raise sonic-social consciousness and empower residents, encouraging recordings of and reflections on everyday soundscapes: rain on metal rooftops, explosions from a nearby quarry, the 'warning music' played by occupying army vehicles. The results, in the form of sound walks and an exhibition, documented favela 'realities, histories and ambitions' through 'immersive sound installation, documentary photography, text and objects',[72] promoting 'the affirmation of citizenship' among Maré publics (Rebelo and Velloso 2018, 144).

A quite different manifestation of the third species is the British PBR network LLEAPP (Laboratory for Laptop and Electronic Audio Performance Practice). Composed of PhD students, it centres on cultivating a group practice, live electronic improvised music, in 'lab' sessions to which participants bring along their laptop-based set-ups and 'bag of sounds'. An alternative to the laptop orchestra (Valiquet 2018a), in LLEAPP boundaries are routinely effaced – between performer and composer, high-tech gear and hacked or found objects, and performance and everyday life. Forebears consciously retained include Cardew, Eddie Prévost, AMM, MEV, John Zorn and George Lewis. Playing with others is the only telos; as one musician put it, 'the playing itself [is] the end result; you meet up, play, just in someone's room, and that's it. It's not a rehearsal, … it doesn't have to work towards

anything.' The focus is on collective scrutiny of live sociomusical interactions, including questions of hierarchy, virtuosity and group communication. The category of the composer is emptied out; as another participant reflected, 'Musician is the only term I'm comfortable with. Composer sounds official, makes it sound like the music you create has some significance.' In the sessions, improvisation exercises and games are tried out, signals and sightlines deliberated, tensions between 'precise communication' and 'decorrelation' probed, the topography of the session considered, whether repetition or beats are acceptable or not and the degree of 'abstraction' of sounds debated. Exchanges occur: 'Let's go for the emergent approach, with no compositional structure.' 'How do we set up the space?' 'In a circle, so there's no centre.' 'How are we going to cable that? It's already spaghetti!' 'Should there be a rule about continuity?' 'Something democratic about anyone being able to stop?' 'Have you ever done Zorn's game pieces, like the guerrilla tactics in *Cobra*?' 'Why don't we discuss musical substance, rather than the technicalities of communication?' 'That leads to partisan discussions about what's better than what. I want to pursue *this group's possibilities*, not aesthetic preferences.' 'I came today with musical ideas – but we need time to coexist.' 'Maybe we should just play free the next ten minutes?' 'What's the objective?' 'Reflecting on the collaborative process …'[73] Boris Groys notes of a similar practice, time-based art, that activities 'take place in time, but do not lead to the creation of any definite product' (Groys 2009, 3). In just this way, LLEAPP's sociomusical practice decomposes the musical subject and abjures absorption into a musical product.

Yet another variant of the third species centres on ethical and social engagements with nonhumans through sound. Augustine Leudar's SARC PhD combined the science of plant electrophysiology with ecological sound art (Leudar 2017).[74] Drawing on research on plant intelligence, and informed by his work with Peruvian Amazonian communities, the project pursued current understandings of how trees 'communicate' in rainforest environments through an underground system of tree roots interlaced with fungal mycelia known as the mycorrhizal network. The project prototyped sonifications of electrophysiological or 'action potential' signals passing around the network, scaling this up to large areas of the forest. By developing novel multielectrode arrays adapted to the mycorrhizal network and sonifying them in real time, Leudar produced unprecedented sonic-spatial representations of 'communication' across the network, with both scientific and artistic ramifications. The resulting 3D site-specific sound installations, presented in Bolivia, Ecuador and Brazil, indicate how 'creating hybrid biological and technological systems … can deepen our

understanding of the biosphere through artistic means' (Leudar 2016, 522), with the potential not only to 'illustrate scientific phenomena [but] perhaps even further scientific research and understanding' (2016, 521). Retaining aspects of Delia Derbyshire, Todd Dockstader, Throbbing Gristle, ambient and drone (Leudar 2017, 42), and recalling Cage's *Child of Tree* (1975) and *Branches* (1976), Leudar's vitalist ontological experiments reconfigure the boundaries between sound art and science, nonhuman and human experience (Whitehead 1978 [1929]; Born 2018), contributing to the burgeoning genre of ecological sound art (Gilmurray 2017) and transforming what music is.

Fourth species: technological and materialist détournements

A fourth species of the logic of ontology focuses on issues of materiality and technology. Those propounding these practices pursue them implicitly or explicitly in reaction to, or in dialogue with, two reigning paradigms of technology in electroacoustic music, with the intent to critique, subvert or *détourne* them. The first is the musical equivalent of the pervasive conception that technology is neutral and instrumental: 'like a transparent medium, it adds nothing substantive to the ends it serves but merely accelerates their realization' (Feenberg 1995, 22). This stance is immanent in acousmatic music's effacement of technology's mediating role (Smalley 1997), as it was in earlier computer art music (Born 1995). The second paradigm reacts against acousmatic music's 'occultation of the means of production' (Haworth 2015, 42) and brings technology to the fore, yet it continues to espouse the neutral-instrumental discourse on technology, reinvigorated through the engineering-oriented logic of innovation. It is embodied in the annual conference series New Interfaces for Musical Expression (NIME), which advocates innovation in digital interface technologies to enhance live musical performance, 'conceived "instrumentally" as tools to realize expressive intent' (Bowers and Green 2018, 114). Coined in 2001 as an offshoot of the ICMC (International Computer Music Conference) and CHI (the international conference for human-computer interaction – HCI – research),[75] NIME embodies an engineering sensibility and has generated a large community of interest (Marquez-Borbon and Stapleton 2015). With its focus on innovating in live interfaces, NIME is driven by goals of superseding the impoverished gestural controls associated with earlier computer music and, more recently, laptop performance. Hence, 'a key motivation behind human-interface research of the past two or more decades has been to move away from the keyboard-mouse-windows concept of HCI towards

more fluid, full-body interaction' (Jensenius and Lyons 2016, 441). These are longstanding concerns in computer music (Born 1995, 182, 186), and they are associated today with a focus on questions of the sensory, haptic, corporeal and ludic.

NIME therefore links the first species – the (re)turn to live performance, interactivity and real-time processes – to positivist norms of HCI design. The core model is rudimentary cybernetics: 'gestures' activate a 'control space' (usually sensor technologies), which are mapped computationally onto a potentially infinite number of 'sound spaces'. The interest lies in the malleable nature of each element and of their interrelations. NIME's 'longest and strongest "trend"' concerns how the design of new musical interfaces employs 'increasingly sophisticated and theoretically better grounded design strategies'; and progress is charted through such indicators as how 'interface micro-controllers for data acquisition and device control have improved …, while higher resolution, faster, and more flexible communication protocols … [have been standardised], and are now widely in use' (Jensenius and Lyons 2016, 440–1). However, NIME is criticised for its deferral of specifically musical concerns, and for paying little attention over the years to the musical potential of the interfaces produced (Marquez-Borbon and Stapleton 2015, 311). Tech demos and scientific papers pack the conference sessions, and incremental variants of technical genres tend to stand in for musical interest. Such a displacement of aesthetic by technical criteria is an enduring feature of computer music (Born 1995, 325). Despite claimed roots in hacking, moreover, NIME research invariably employs corporate technological infrastructures, showing unsteady engagement with the post-digital politics of technology.

It is against this background that variants of a fourth species of the logic of ontology are discernible in an array of technological and materialist practices that *détourne* the neutral-instrumental, 'functional-engineering' paradigm (Bowers and Green 2018, 114) evident both in acousmatic music and in NIME. A first manifestation is the work of John Richards, AKA 'dirty electronics', of the MTIRC at De Montfort University, Leicester. Richards avows a post-digital aesthetics and politics through a genealogy encompassing, inter alia, David Tudor, Howard Skempton, Christopher Hobbs, Fluxus, Reed Ghazala, Nicolas Collins, Throbbing Gristle, punk, Merzbow, instrument builders Hugh Davies and Michel Waisvisz, and participatory art theorists Nicolas Bourriaud and Claire Bishop. Dirty electronics situates itself 'against the alienation and corporateness of digital technology' and amid wider movements to counter and critique those black-boxed corporate technologies (laptop,

mobile phone) that invite mere consumer engagement. Through a tactile relationship to cheap, low-tech materials, 'hacking, circuit bending, open-source hardware and software and the appropriation of found objects' as well as Tudor's 'composing inside electronics' take centre stage in a DIT ('do it together') workshop-and-performance practice focused on the musical sounds engendered by collaborative, non-expert instrument building (Richards 2013, 274). Against NIME's linear 'interpolation' model (Richards 2008, 30), dirty electronics advocates instruments and sounds that resist standardisation and commodification.

In one dirty electronics workshop, 'kinetically powered' synthesisers were made collaboratively out of raw components – magnets, wire, capacitors – to explore the nature of the generic power supply, at the same time as rendering it a musical instrument. Richards noted, 'Power is something we take for granted. You switch on your iPhone and charge it – it's meant to be transparent. But when you look carefully, you realise [the power supply] can change the way a synthesiser sounds. Doing dirty electronics is an attempt to understand the world of technology by simplifying, … to strip things away and be left with the fundamentals [of] how electricity and sound are created. The irony is, in many ways the attempt to make things simpler … just shifts our understanding of complexity.'[76] The interrogation of the black boxing of technology driving dirty electronics testifies to a materialist form of the politics of ontology, questioning the nature of the musical work (is the 'piece' 'the process of building an instrument, the instrument itself, a notated score, the schematic, or the live performance?'); of compositional practice ('the process of composing would involve developing circuits on a breadboard … [using] trial and error' (Richards 2011, 23)); and of the composer-subject – in that musical imagination arises from collective technical labour and group improvisation. If acousmatic music denies its social and material mediation, here both are brought vividly, insistently, to the fore.

Dirty electronics is, then, deeply involved in transformative boundary work. On the one hand, it erases the borders between music and sound, as well as translating erstwhile nonacademic practices – hacking, circuit bending – into the academy; on the other hand, it intervenes with partners on the margins of NIME as a reflexive irritant. One 'design provocation' titled 'One Knob to Rule Them All' aimed to 'incite reflection over a rich variety of issues in NIME' (Bowers, Richards et al. 2016, 2), problematising the nature and value of interaction hardware, control in musical interfaces and one-to-many mappings, while raising matters of gender and power. This was accomplished by a method, 'research through design' (Bowers and Green 2018, 115),

committed to the productivity of rapid 'makes', public performance and 'constrained functionality' ('the rhetoric surrounding commercial controllers [and some] contributions to NIME is about liberating expressivity from constraint … Our work suggests the … exact opposite' (Bowers, Richards et al. 2016, 6)). On occasion, then, NIME acts as a theatre for such boundary work, evident in the staging of epistemological and ontological contests between academic and nonacademic practices.

A different variant of the fourth species turns on conceptual approaches to noise, the theme of a conference at Huddersfield University's CeReNeM in 2013 on the centenary of Russolo's 'Art of Noises'. Hosted by composers Aaron Einbond and Aaron Cassidy, 'Noise In And As Music' attempted to fold the nonacademic noise avant-garde into the academy. Compared to dirty electronics, the noise scene has enacted a more abject, totalising rejection both of corporate technologies and of technical knowledge and skill. If noise musicians draw 'junk metal, homemade electronic devices, drum machines, amplified motors, and power tools' into musical performance (Novak 2013, 178), they 'are not tech-savvy people … [and] do not demonstrate mastery over their machines'. Instead, in the lineage of industrial music and Survival Research Labs,[77] they 'ritually destroy their own technological creations' (2013, 175). At Huddersfield, noise's meanings had evolved: the focus was on noise as material and method of composition, on how noise's 'meanings have multiplied … to the point of dissolution. The noise of Peter Ablinger, Merzbow, Dror Feiler, and others is not another node in an existing network of signification but instead a deliberate … obliteration of hierarchies and codes.' Hence, 'in the context of the "big data" of our century', and 'freed from its earlier semiotic function as a symbol or cipher, noise now demands its own ontological rules' (Cassidy and Einbond 2013, xiv–xv). Ironies abounded: as George Lewis remarked, 'a sonic practice that embraces noise too insouciantly runs the risk of succumbing to the regulative force of genre, and thereby losing its noisiness' (Cassidy and Einbond 2013, 123); while Pierre Alexandre Tremblay conceived of the present as a post-noise era of 'inbetween-ness', 'full of rich crossovers and hybrids' (Cassidy and Einbond 2013, 78).

Central to the events was composer Peter Ablinger's lecture-performance espousing white noise as the 'totality of all sounds and noises', by analogy with Malevich's 'Black Square' painting, against the 'de-contextualization' and 'individualization' of sound by Varèse and Cage (Ablinger 2013, 6–7). Instead, Ablinger allied himself with Xenakis, Cecil Taylor, noise rock and others dealing with mass phenomena, extreme density and sonic totality. In turn, conceptual noisician James Whitehead

(JLIAT), drawing on speculative materialism, equated noise with the 'objective reality' that digital music storage creates quantities of data that far exceed human perception, so that noise expands 'beyond the human': 'quantity overwhelms the system [and] qualitative judgments are no longer possible' (Whitehead 2012, 28–30). Taking a different strategy to noise and massification, Marko Ciciliani's installation-performance *Pop Wall Alphabet* consisted of 26 pieces, each representing in alphabetical series a classic album from a pop artist: Abba, Beastie Boys, Chemical Brothers, Devo, etc. Two kinds of material derived from each album – a superimposition of all the songs, and a spectral freeze of all the songs – were subjected to the same formal algorithm, resulting in the sonic material phasing in and out over the duration of each piece. In this material, 'all the frequencies and amplitude changes are present as they [originally] occurred; however, due to the phase randomization, the audio sounds subjectively like [a continuously changing texture] of bandpass-filtered noise' (Cassidy and Einbond 2013, 192). If individual tracks are unrecognisable in the dense sonic texture, the piece plays conceptually and ironically on the idea that in pop production each artist has a 'signature sound', and that through the 'condensing process' this sound is made audible, like a ghost, in the 'wall' of noise (Cassidy and Einbond 2013, 194). In striking contrast to NIME, the Huddersfield events explored the musical and conceptual ambit of an array of noisy materialisms.

A third manifestation of this species joins an overt institutional politics to alternative sonic materialisms. The New Aesthetics in Computer Music (NACM) research project at York University, led by Tony Myatt and Mark Fell and funded by the AHRC, sought to reframe computer music itself. Its purpose was, through residencies, to document and valorise the musical and technical practices of nine previously unacknowledged nonacademic musicians, bringing them physically, aesthetically and conceptually within the academy.[78] NACM drew attention to the critical role of labels (Mille Plateaux, Mego, Touch, Warp, Raster Noton) in the emergence of a host of experimental electronic genres. It used the terms 'oppositional and independent practice' to identify 'both the independence of sound artists and composers who work outside academe, and the idea that much work in this field is in opposition to received musical aesthetics', notably acousmatic and 'structuralist' lineages (Myatt 2008, 1). Two exemplary directions indicate the stakes. The conceptual artist Yasunao Tone, a leading figure in the Japanese Fluxus movement, is known for 'creating sound using non-musical objects', for embracing indeterminacy in relation to digital technology, and for projects probing translations between text, image and sound (Blake et al. 2010, 1). Influenced by Dick

Higgins' concept of intermedia and Gérard Genette's idea of paratexts, Tone's interest is in how 'representational information is distorted and erased as it is transposed from one medium to another' (2010, 2), thereby deviating from the 'telos' of each medium. He came to prominence in 1985 with his *Wounded CD* series in which physical interventions that 'de-control' how a CD produces sound 'cause the playback technology to "fail" as the laser misinterprets the information' (Haworth 2013, 187), undermining the 'perfect reproduction' attributed to digital media. For NACM, Tone developed 'MP3 corruption audio software' guided by indeterminacy, subverting the MP3's normative status as a 'robust audio format, designed to survive corruption'. With corruption parameters audible in real time, he explored the sounds of twenty-two 'error types' in MP3 decoding. 'Rather than imposing existing musical forms', he sought to generate an aesthetic specific to the medium (Blake et al. 2010, 2).

The 'harsh noise' and conceptual multimedia artist Russell Haswell used his NACM residency to work towards a 'black film' project. Haswell is a proponent of 'extreme computer music' (ECM), as in *Blackest Ever Black*, an album produced in collaboration with Florian Hecker using Xenakis' UPIC system. Demonstrating its combined musical and conceptual ambition, the album was accompanied by a booklet invoking Bergson, Beckett, Serres, Deleuze and Guattari (Mackay 2007). Claiming Xenakis as forefather, and defying any boundary between art and popular music, ECM 'strives to demonstrate the specificity of … computation' in the arts through 'rigorous formalisms, machine sounds [that] have no equivalent in Nature, and by conceptualizing and problematizing the use of computers in music' (Hoffmann 2009, 25). It is Xenakis' insistence on sonifying the particular materiality of the computer rather than using it to synthesise naturalistic models of musical sound that ECM embraces. Rather than physical modelling, where natural acoustics provide the mathematical basis for synthesis, Xenakis employed abstract models as the basis of the sound signal. A key contribution was his technique of dynamic stochastic synthesis (DSS), which applied Brownian motion – a mathematical model describing the random movement of gas molecules – to the generation of waveforms. DSS derived from Xenakis' critique of Fourier analysis, which underlay the majority of sound synthesis tools and research of his day, and which, by reference to Meyer-Eppler's acoustical studies, he considered 'sonically and ideologically flawed' (Haworth 2013, 190). Austerely abstract, non-gestural, non-narrative, and with abrupt shifts and silences, Haswell's music proffers an anti-aesthetic to acousmatic music, as well as a paradigm shift from a view of synthesis programs as aesthetically neutral to one that acknowledges

their immanent conceptual status and aesthetic colouration. In retaining and extending Xenakis' music and ideas, Haswell's ECM embodies a genealogical intervention, simultaneously remaking musical past, present and future. At the same time, it fleshes out NACM's critique of programmatic modernist rationalism in favour of a conceptual, sonic-and-computational materialism oriented to novel aesthetic horizons.

In sum, the four species of the logic of ontology sketched in these pages convey, in microcosm, something of the diversity of musical, technical and conceptual directions issuing from the music technology degrees and related scenes at the centre of my ethnography.

Conclusions

All maps are drawn from a perspective; 'there is no single authentic map' of contemporary music (Clarke 2007, 30). I am aware that my analysis of the institutional configuration, aesthetic and conceptual genealogies and present-day practices outlined in this chapter might seem strange or anachronistic – especially to American eyes and ears. That does not, of course, invalidate the account. In an important overview of the 'political economy of composition in the American university, 1965 to 1985', Jann Pasler depicts it as dominated by a few academic centres (Eastman, Columbia, Juilliard, Yale and Princeton), while also encompassing corporate-orchestral tie-ups and local composers' groups. She argues that American composition in this period was pluralist not only institutionally but aesthetically, with coexisting European modernist and American nationalist schools, and that American music generally has a 'propensity for change and synthesis' embracing 'all kinds of cultures and all types of music – popular and elite, Western and Eastern, European and American – many of which are increasingly taught' (Pasler 2008, 360–61). Perhaps, then, the US attained a pluralist condition well in advance of the UK and Europe, in part, as Pasler describes, through its surfeit of university-trained composers along with the loosening hold of academia on the contemporary music economy. Yet the generational changes and lineages she relates seem neater, more academic-centred and school-bound than the explosive yet patterned multiplicity of recent currents in digital music conveyed here, a core dynamic of which is how creative interdisciplinary practices that are neither academic nor corporate-based are being brought in to replenish the resources of the academy. This is not to prejudge whether the musical directions that prove generative over the long term will derive from this replenishment; but it is to say that it is salient, that it will produce unforeseeable hybrids, and that

these hybrids may prove musically, culturally and politically valuable.

Like Pasler, I have found it convenient to use the term 'pluralism' in this chapter and even in the title. But while it is 'ready-to-hand', I want to subject it to scrutiny. Both William Connolly and David Clarke provide productive commentaries; both portray pluralism as immanently cultural and social; and both draw on Chantal Mouffe (Mouffe 2000) to argue that pluralism requires that cultural and social antagonism should be transmuted into agonism (Connolly 2005, 47). Indeed, for Connolly, two 'cardinal virtues' mark pluralism: 'agonistic respect' and 'critical responsiveness' (2005, 123–7), the latter entailing '*careful listening and presumptive generosity* to constituencies struggling to move' from a position outside the realm of legitimacy and recognition to a place within it (2005, 126). Reminding us that 'pluralism is not the same as cultural relativism' (2005, 41), he alerts us to how 'the expansion of diversity in one domain ventilates life in others as well' (2005, 6). For his part, Clarke registers how central music education is to the challenges posed by a pluralism that aspires to encompass modernism and popular music (Clarke 2007, 7–8), concluding that it is through 'dialogical interaction' that views held by proponents of each may change and progress occur, 'negotiated around our antagonism' (2007, 38). Both writers stress pluralism as practice and process, pointing towards the varieties of boundary work oriented to reshaping dominant classifications – music and sound, art and popular music, academic and nonacademic, digital and post-digital practices – portrayed in this chapter. Their accounts contrast starkly with the hostile nature of earlier debates over musical pluralism, such as those at Darmstadt in the 1970s, when the term became a lightning rod for controversy over the rising influence of American experimental music (Beal 2006, chapter 6), as well as with a more recent claim that 'the core of modernism' is its 'quintessentially pluralistic' nature (Heile 2004, 165). To be sure, musical modernism is and has been differentiated; but faced with the wide-open vistas of twentieth- and twenty-first-century musics, and the constitutive aesthetic-and-social exclusions of Western musical modernisms (Born 1995; Born and Hesmondhalgh 2000), it is incredible to write of such modernisms as epitomising pluralism.

In light of this chapter, two additional points must be made. First, one lesson of this study is that it is no longer sufficient to write of pluralism in the abstract. For this simply defers the now urgent need to analyse the specific practices at work in the radically diverse musical currents apparent today, such as those touched on in this chapter, but also in the historical lineages that inform today's practices – among them

avant-garde, experimental and modernist tendencies *within* diverse genres of jazz, improvised, rock and electronic popular musics. Suggestive of how to render such diversity in all its specificity is Bernard Gendron's detailed analysis of the successive waves and the heterogeneity of engagements between popular music and modernism in Europe and the USA over the course of the twentieth century (Gendron 2002).[79] Judy Lochhead registers the challenge when she observes of music in the last thirty years: 'in both the popular and classical traditions, there is a tendency towards a proliferation of styles and a micro-specificity of substyles', noting 'the underlying embrace of difference that generates them' (Lochhead 2018, 419–20). In short, we need less talk of pluralism and more building of conceptual frameworks to analyse and, potentially, valorise the particular forms taken and the genealogies generated by diverse boundary crossings and logics of ontology in music.

Second, if pluralism is grasped critically as at once an aesthetic and social phenomenon, then attention must be paid to what is packed into that 'social'. In this chapter I have attended more to digital art music's institutional forms and less to its demographic features: the characteristic whiteness and maleness of the scenes portrayed here (Born and Devine 2015, 2016). George Lewis denounces pluralism as ideology, adding necessary political edge. He notes that decolonising perspectives would 'tend to destabilize pluralisms that concentrate on preserving difference while failing to analyse power' (Lewis 2018, 445). His point is that talk of pluralism can cover over the power differentials that limit that apparent pluralism, evident in its constitutive aesthetic-and-social exclusions. As Patrick Valiquet observes, 'some pluralities simply apply a new aesthetic surface to old social exclusions… [Indeed] plurality can also intensify and multiply exclusions' (Valiquet 2018b, 108). In place of pluralism, when anatomising the 'Afrodiasporic lacuna in contemporary music' (Lewis 2020, 13), Lewis advocates concepts of creolity (Spivak 2006) and intersectionality (Roelofs 2017), emphasising that aesthetic practices often become 'the modality through which intersectionality and creolity are lived' (Lewis 2020, 19). Certainly, the musical creolities and Afrofuturisms chronicled by Lewis and other writers would add a whole, welcome continent to the map drawn by this chapter (Eshun 1998; Gilroy 1993; Lewis 2008). It follows, emphatically, that power's traces must be uncovered: black electronic musics from the global South and North are largely missing from the music technology scenes, and the politics of ontology, deciphered in this chapter, highlighting the immanently white, raced nature of these scenes – a constitutive outside to the circumscribed hybridities being trialled. Indeed, given its focus on white, male academic

scenes, arguably this chapter contributes to the ongoing marginalisation of black electronic music and sound art, postponing a question being articulated with increasing urgency: 'what would a decolonized understanding/history of sound art sound like?' (Stoever 2021, 16).

Yet power is apparent also in a different modality in the relatively low cultural and educational status attributed to a number of the British universities energising these scenes, a situation likely only to be compounded by the intersectional realities of their relatively lower social class undergraduate populations – realities that are consequential. Given this demographic and institutional profile, it is imperative to ask: what are the chances of the musical directions detailed in this chapter becoming culturally mainstreamed or reshaping the ongoing cultural hierarchies of cultural legitimacy (Born and Devine 2015, 154–168)?

Another theme of the chapter has been escalating challenges to longstanding classificatory boundaries – between art and popular music, music and sound, digital and post-digital, academic and nonacademic practices. Dominant classifications, according to Bowker and Star (1999), do infrastructural work, rooting epistemologies and ontologies. They are embodied in cultural and knowledge systems, institutions and policies, practices and materials; they are 'invisible, potent entities' and 'silences [surround] them' (Bowker and Star 1999, 3, 5). Dominant classifications therefore tend to exhibit inertia. Yet despite their longevity, at certain junctures they will change, with effects on history itself: as Ian Hacking observes, 'if new kinds are selected, then the past can occur in a new world' (Hacking 1999, 130). As the chapter has shown, it is just such transformations of the classifications underpinning Western art music that are now in process in the guise of the boundary work manifest in classrooms and creative practices intent on reshaping established genres and animating novel experiments in music's ontologies.

At the heart of the chapter has been the attempt to analyse the relationship between institutional and educational changes, on the one hand, and mutating creative practices, on the other. Institutional change was addressed in the several trajectories making up the second constellation (pp. 316–29), especially those bound up with what has been called the neoliberal university. Yet the neoliberal university emerges from this chapter as more than one-dimensional: as an environment deeply coloured by distinctive institutional histories, and as capable of energising institutional invention – as in the creation of the internationally esteemed music technology and sound art centres represented by SARC at Queen's University, Belfast, MTIRC at De Montfort University, Leicester, CeReNeM

at Huddersfield University and CRiSAP at University of the Arts, London. To understand this is to acknowledge the emergent nature of historical process: how the changes described in the chapter must be understood as resulting from multiple interacting trajectories – trajectories grouped analytically in the first half of the chapter under three dynamic constellations. Hence, the neoliberal policies visited on these universities were leavened by their synergistic interrelations with the other constellations – in particular, by the universities' reception of growing numbers of autodidact young digital musicians wanting to study music, and by the entry of a cascade of aesthetic currents new to the academy, some of them mounting profound challenges to reigning ontologies of music. It is as though the neoliberal university – by encouraging entrepreneurialism, interdisciplinarities, a research orientation and novel conceptual horizons – became a propitious host for an emergent, urgently-felt collective sense of musical transition 'beyond the acousmatic' – and beyond certain shibboleths of twentieth-century Western art music. Yet in hosting these currents, the neoliberal university also drew close to an array of existing alternative institutions and networks – from risk-taking labels and internet radio stations, to festivals, clubs, musicians' collectives and the art gallery nexus. As Simon Waters, a musician influential on the 'new practices', foresaw in 2000, 'the protectionist (acousmatic) tendency [has failed] to acknowledge that changes of context, even if "outside" the discipline, reconstitute the way things within it' proceed (Waters 2000, 79).

Democratisation is a term to be used with care when addressing the impact of digital technologies on music; in David Hesmondhalgh's words, 'the rise of digitalisation is unlikely … to lead to any profound democratisation of musical creativity … without transformation of broader economic and social conditions' (Hesmondhalgh 2009, 58). Through its analysis of the three constellations, this chapter suggests that certain conditions have changed. The explosion in the availability of consumer music technologies and laptops paralleled by the internet-based circulation of software, research and music archives beyond academia, addressed in the first constellation, fostered unprecedented access to means of musical production. In the UK these developments, along with wider musical, cultural and social changes, put pressure on higher education in music, resulting in the rapid growth of music technology degrees (Born and Devine 2015). In consequence, experimental and crossover sounds, concepts and practices championed by student musicians and younger academics are reinvigorating this sector of academic music, circumventing musicology's neglect of key lineages of late twentieth- and early twenty-first-century music. It is

arguably the broadening of the musical and social class profile of the student population taking music technology degrees that brought such pressures to bear on academic music, and thence a kind of cultural democratisation – the long-term musical productivity of which will, inevitably, remain a matter for debate.

This extension of the music-higher-educational franchise points to other realities, and three paradoxes. The first stems from the 'Malthusian overproduction of artists' (Smith 2006, 697): the sheer increase in the numbers of aspiring musicians leaving music technology and other trainings, exiting into a work environment characterised by precarity and intense competition for 'opportunities' (Smith and Thwaites 2019, 590). Some will be content to pursue music as a vocation or as an amateur, with little expectation of making a living from music. Strikingly, those aspiring to enter composition as a profession from university trainings have exactly the profile that Bourdieu, writing in the late 1970s, identified with the avant-garde: an 'elite status on certain measures of class and inequality, such as education, cultural capital and, to an extent, social capital', yet 'a much lower level in terms of income and job security' (Smith and Thwaites 2019, 593; Bourdieu 1980 [1977]). Given the huge increase in those trained and seeking to work as musicians, composers and sound artists, it is plausible to speak of a massification of the avant-garde in music today – paradoxically, given that the avant-garde was conceived historically as a marginal entity opposed to academic and bourgeois art establishments. Indeed, what we are witnessing is a mutation in the nature of the avant-garde. As Hal Foster writes, the avant-garde today 'does not pretend that it can break absolutely with the old order or found a new one; instead it seeks to trace fractures that already exist within the given order, to pressure them further' (Foster 2015, 4), a formulation that captures beautifully the erosion of old orders by the four species of the logic of ontology. Or perhaps, as Gregory Sholette contends, recent generations represent a swelling of 'creative dark matter', those 'amateur, informal, … self-organized practices' that operate 'in the shadows of the formal art world' and build proliferating 'micro-institutions' designed to bring a 'degree of autonomy from the critical and economic structures' of that art world (Sholette 2011, 1–4).

Also evident are paradoxes to do with the nature of time. Throughout this chapter I have pointed to how the musical present is constituted by a reshaping of history and a crystallisation of novel imaginaries: how musicians are intently revising the musical past by producing new genealogies as this feeds their present work and the futures it protends – coproducing musical present, past and future. Boris Groys comments on the non-teleological quality of time that results: 'the present has ceased

to be a point of transition from the past to the future, becoming instead a site of the permanent rewriting of both past and future – of constant proliferations of historical narratives' (Groys 2009). Another paradox is therefore how the insistent coining of novel pasts can result in a waning of historicity. One response to this situation is the elaboration by art theorists of the concept of the 'contemporary'. For Peter Osborne, if by the mid-1980s 'postmodernism had become the periodizing term … to mark the distance from a now-historical modernism', then the contemporary has replaced it as the term for the artistic present, emerging in the 2000s with the 'discrediting of postmodernism as a coherent critical concept' (Osborne 2013, 17). 'It is the "presentness" of the contemporary that distinguishes it from the … category of modernity [and its] inherently self-surpassing character' (2013, 24). Contemporaneousness, then, is the modern shorn of its 'contract with the future' (Smith 2006, 703) – and it names the vertiginous temporal condition lived by my interlocutors.

But a final paradoxical quality of time is also discernible in the ethnography related in this chapter. It is clear that the four species of the logic of ontology, however inventive, retain earlier forebears – inter alia Cage, Tudor, Amacher, Oliveros, Young, Xenakis, Lucier and so on. Yet it is striking that the imitation-with-difference pursued by current practitioners tends to generate what might be called minor variation – many slightly variant versions that combine speciation and individuation, remixing given elements to forge new aesthetic, material and conceptual directions often through tiny differentiations between the previous and next musical object or event, or between one composer or musician or genre and the next – evolving, but only minutely.[80] My research was marked, then, by constant encounters with only slightly variant practices, so that each musician, sound artist, practice or new musical interface had a singularity, but often in a quite minor way. Perhaps this stems from the massification of the worlds of digital art music – in the UK, in part, through its rapid expansion in higher education. The net effect is the emergence of vast fields of practice, best captured in metaphors of billowing clouds or evolving populations. Yet paradoxically, it is common for the actors to claim that their musical or sonic practices are *sui generis*; symptomatically, key sounds and paradigms – notably glitch and noise – are the locus of intense disagreement about their defining qualities and whether they cohere as a genre or a metagenre, or defy genre altogether (e.g., Brassier 2007; Demers 2010).

To understand the temporality of this situation it is helpful to draw on cogent thinking about genre, notably Franco Moretti's idea of tracing the movements of macro textual populations (Moretti 2005), to which

Karin Barber adds a conceptualisation of the mobile organisation of such textual populations inasmuch as they 'continually deviate, innovate, branch out, flourish for a while, fail and are eclipsed' (Barber 2007, 41). Such perspectives may be especially apt for periods like the present in which every musical assemblage protends a slightly different future, a minor variation – so that together they add up to mobile congeries, fields in flux. Similarly propitious is the attention paid by the historian of science Hans-Jörg Rheinberger to the temporalities of experimental scientific systems. Particularly suggestive is his analysis of the 'intrinsic time' of such systems, which undergo 'continuing cycles of nonidentical reproduction', thereby composing 'drifting, merging and bifurcating' universes (Rheinberger 1997, 180–1). Rheinberger employs Derrida's concept of *différance*, 'the production of differing [or] deferring', to account for a 'displacing dynamic' that characterises the research process. Indeed for Rheinberger, '"différantial" reproduction … is precisely what endows a research system with its generative power' (1997, 82). Experimental systems – like the billowing clouds or evolving populations of digital music practices – are thus engaged at once in the non-teleological production of difference, deferral and historical time. It may be that the hybrid nature of digital art music – at once music, technology and science – explains the power of this analogy.

What is made perceptible by such perspectives on the musical 'contemporary' is music history in the non-teleological making: how things look when, like the many musicians whose practices I have recounted, one is immersed in or wading through the wide, endlessly refreshed and flowing streams and rivers of practice. Indeed, such a non-teleological, non-subject-centred image of music-historical process may be the final contribution of this study of digital art music in the middle of a period of creative flux. Of course, this ethnography is definitively tentative: my analysis will enter into the situation, through ongoing dialogues with interlocutors, whose responses will ensure that it will continue to evolve.

Notes

1 I use the term 'digital art music' as a placeholder for a broad, contested space of electronic, electroacoustic and computer art music and sound art genres and practices, the evolving interrelations between which, as well as the forces fuelling such changes, are the focus of this chapter. Marie Thompson has similarly drawn attention to the need to problematise apparently self-evident categories of music – 'contemporary', 'modern', 'avant-garde', 'experimental' – that resist definition and are effortfully being 'made and remade' (Thompson 2020, 275–6).

2 The UEA department was closed down soon after my visits in 2011; this formed part of a wave of closures and restructurings of music departments in the UK affecting almost all those I visited.

3 On the terminological debates signalled by these overlapping terms, see Landy (2007, 2017); Collins (2009). On the definitional effort required to identify sound art as an 'art form', see Maes and Leman (2017).

4 I am not alone in proposing this: higher education is seen as a consequential institution for the reproduction and potential transformation of broader hierarchies of social and cultural power by Mohanty (2003) and Ahmed (2012).

5 On the logic of ontology, see pp. 318–19 and pp. 340–59 above. A full account is Barry and Born (2013, especially 17–29).

6 On the concepts of retention and protention, adapted from Husserl and Gell, see Born (2005, 20–4), Born (2015), and Haworth (2018).

7 Inter alia the International Computer Music Conference (ICMC), Electroacoustic Music Studies Network (EMS), New Interfaces for Musical Expression (NIME), and Society for Electro-Acoustic Music in the US (SEAMUS).

8 Inter alia 'Comprovisation' (Montreal, 2012), 'Bodily Expression in Electronic Music' and 'Mind the Gap' (Graz 2010, 2013), 'Speculations in Sound' (Huddersfield, 2015), 'Transmediale' (Berlin, 2012), 'Geometry of Now' (Moscow, 2017), and several editions of the Darmstädter Ferienkurse and Berlin-based MaerzMusik.

9 Some of these divergences can be conveyed by differences between the findings of this chapter and chapter 7.

10 Such institutional invention occurs on what I call the fourth plane of social mediation (Born 2011, 2012): the postlude fully elaborates this point, see especially pp. 459–64.

11 The analysis is based on demographic data for five years between 2007 and 2012: this is obviously a specific and limited period, and how the situation has changed in the decade since is unclear.

12 https://www.aec.at/festival/en/. Accessed 31 January 2022.

13 http://90.146.8.18/en/archives/prix_archive/prixJuryStatement.asp?iProjectID=2598. No longer available.

14 https://www.youtube.com/watch?v=h-9UvrLyj3k Accessed 31 January 2022.

15 Barry Truax, "Prix Ars Electronica 99 (Computer Music)," CECdiscuss, 2 July, 1999, http://alcor.concordia.ca/~kaustin/cecdiscuss/1999/1341.html. No longer available.

16 For an overview of Sound and Music, see Graham (2016, 71–5).

17 http://www.holstfoundation.org/media/Open-Letter-SAM-ACE.pdf. No longer available.

18 http://v2.chrisswithinbank.net/2012/04/response-to-letters-to-sam-ace/. Accessed 31 January 2022.

19 Trajectories is a term used by Connolly (2011), drawn from Deleuze and Guattari (1987), to index non-teleological analyses of change. He links it to new theorisations of time and historical process, as do I.

20 Joseph (2008, ch. 1) proposes a similar methodology for writing 'minor histories' of the musical avant-gardes of the 1950s and 60s.

21 This compares with a *c*.150 per cent growth in students on traditional music degrees over the same period, and a national rise in undergraduate student numbers of *c*.75 per cent.

22 The Russell Group is a self-appointed organisation representing 24 of the leading universities in the UK, often considered the country's most prestigious: https://russellgroup.ac.uk . Accessed 31 January 2022.

23 The examination board Edexcel introduced the first Music Technology AS and A2 courses in 1998.

24 On prosumers see Toffler (1981); Ritzer and Jurgenson (2010).

25 See Abendroth and Porfilio (2015); Thornton (2015); Rustin (2016); Ergül and Coşar (2017); and on the new public management Olssen and Peters (2005). REF is the Research Excellence Framework (https://www.ref.ac.uk), which in 2014 replaced RAE, the Research Assessment Exercise; TEF is the Teaching Excellence Framework (https://www.officeforstudents.org.uk/publications/student-outcomes-and-teaching-excellence-consultations/the-tef); and NSS is the National Student Survey (https://www.thestudentsurvey.com). Accessed 31 January 2022.

26 The declining confidence has generated attempts to recalibrate the value of the arts and humanities, signalled by the AHRC's 'cultural value project' (Crossick and Kaszynska 2016).

27 http://www.ahrc.ac.uk/newsvents/news/industry-and-university-partnerships-to-power-a-creative-revolution/. No longer available.

28 Justin O'Connor, personal communication, December 2014; see also O'Connor (2011).

29 On differences between practice-based and practice-led research, see Candy (2006); on the European arts doctorate, ELIA (2016); on artistic research, Borgdorff (2012). I use the abbreviation 'PBR', widely used in the UK, to encompass different approaches.
30 A phrase used by a leading figure from another centre.
31 CCRMA is Stanford University's Center for Computer Research in Music and Acoustics. The creation of IRCAM in the 1970s also followed trips by Boulez and his advisors to CCRMA (Born 1995, ch. 3).
32 Interview with Michael Alcorn, March 2011.
33 HEFCE was, until April 2018, the Higher Education Funding Council for England.
34 Interview with Andrew Hugill, January 2012.
35 AMM was founded in 1965 by Keith Rowe, Eddie Prévost and Lou Gare and is considered formative of European free jazz and improvised music. Toop (2016, 219) argues that its hostile reception among classical music critics in the 1970s and 80s revealed a 'class contempt'.
36 The structure has since changed, and, following a merger with Art and Design, Music, Humanities and Media have been incorporated into a new School of Creative Arts.
37 The intake of undergraduate students to music and music technology degrees in the University as a whole is in the region of 300 a year, 100 of them in Engineering.
38 They were: Music and Promotion BA, Music and Sound for Image BA, Music BMus, Music Journalism BA, Music Production and Sound Recording BA, Music Technology – Creative Music Technology BMus, Music Technology and Audio Systems BSc, Music Technology and Popular Music BA, Music Technology BA, Music with a Modern Language BA, Music with Drama BA, Music with English BA, Popular Music BA, Popular Music Production BA, and Popular Music Production BSc (all Hons).
39 Electronic music was taught at Morley College by Daphne Oram in the 1950s; and in 1969 Cardew formed the Scratch Orchestra there with Howard Skempton and Michael Parsons.
40 Interview with Cathy Lane, March 2013.
41 http://hernoise.org. Accessed 31 January 2022.
42 https://zkm.de/en/event/2012/03/sound-art. Accessed 31 January 2022.
43 https://www.tate.org.uk/whats-on/tate-modern/her-noise-feminisms-and-sonic/her-noise-symposium. Accessed 31 January 2022.
44 Cf. Piekut (2019, 440). The absence of musicological attention feeds readerships for magazines like *The Wire* and critics like Simon Reynolds, Mark Fisher and Kodwo Eshun (see also ch. 9).
45 For a biting articulation of this critical position see Hall (2016), citing Rebhahn (2013, 13–14).
46 For example Williams (2013). On the evolution of Darmstadt modernism from 1945, including aesthetic and ideological debates and crises, see Beal (2006); on its inheritors after 1968, Williams (2013). For defences of the continuing relevance of Darmstadt modernism see Heile (2004), Fox (2007).
47 For a clear statement of this critique see Myatt (2008). Leading figures in the acousmatic tradition in France are Pierre Schaeffer, Pierre Henry, Bernard Parmegiani and François Bayle; in the UK, Denis Smalley, Jonty Harrison, Simon Emmerson and John Young; in Montreal, Francis Dhomont and Robert Normandeau. I bracket the longstanding controversy in this tradition over the referentiality of recorded sound.
48 Indicative of the incipient critical literature on these lineages are Nicholls (1991); Toop (1995, 2016); Potter (2002); Collins (2004); Beal (2006, 2009); Labelle (2006); Licht (2007, 2009); Joseph (2008); Adlington (2009); Demers (2010); Grimshaw (2011); Piekut (2011, 2014); Piekut and Nicolls (2012); Iddon (2013).
49 For a fuller account of Fell's genealogy see Fell (2013, 194–203). Fell's music is discussed also in ch. 9 (pp. 410–12).
50 The following ethnographic snapshots are drawn from my fieldwork sites; names have been changed.
51 See Collins (2011) in Dean (2011). On this point, little has changed since early computer music textbooks from the 70s and 80s, which devoted short chapters to 'Rock' (Griffiths 1979) or 'Rock and Popular Electronic Music' (Manning 1985). Nick Collins (1975–) has led in bringing electronica and sound art into British academia, fostering the generational shift being charted. Yet showing how unsteady and controversial is this move, his own textbook, Collins and D'Escriván (2007), ends with a statement of ambivalence towards it (Barrett 2007).
52 See Kronengold (2008).
53 https://www.youtube.com/watch?v=61pube7P8ok&t=746s, track 3: 'Gibbon'. Accessed 31 January 2022.
54 Concepts indebted to the art theorist Rosalind Krauss (1979, 2000); cf. Waters (2000, 80).

55 See, inter alia, Kim-Cohen (2009); Barrett (2016); Ciciliani (2017); Erwin (2016); Walshe (2016).
56 In writing of ontologies and politics, it might be thought that I am referring to Mol's (1999, 2002) idea of ontological politics. But the material that follows requires a different framework. At issue is a politics of ontology – more precisely, an array of degrees and kinds of politicisation associated with more or less conscious experimental revisions to the ontology of Western art music and acousmatic music, as detailed below. Mol's idea is a general one having to do with the relative primacy of contending ways of enacting an object; as such it is not an appropriate framework to address the nuances of the ontological experiments in music that I relate.
57 I use the term species rather than genre to emphasise how the principles of resemblance loosely grouping each species are not those normally associated with genre; they are to do with variant experimental ontologies of music, and each species can subsume multiple genres.
58 See also Kane (2014, 225–6).
59 Some proponents of electroacoustic art music argue that the practice of live sound diffusion amounts to a form of human mediation. I take the view that it is a relatively minor form.
60 https://www.youtube.com/watch?v=Z-8DX7g2zEc. Accessed 31 January 2022.
61 https://www.youtube.com/watch?v=CAIh8FxLMtk. Accessed 31 January 2022.
62 https://www.youtube.com/watch?v=nlyJK80lYuE. Accessed 31 January 2022.
63 https://vimeo.com/48964815. Accessed 31 January 2022.
64 https://www.youtube.com/watch?v=Pl20pWFSdGA; https://www.youtube.com/watch?v=ZVOZbZUYuHM; https://vimeo.com/12795632. Accessed 31 January 2022.
65 See Ouzounian (2017) on this broad lineage, which she folds under the term 'sound art and environment'.
66 http://iem.at/%7Eeckel/art/art.html. Accessed 31 January 2022.
67 https://vimeo.com/156082277. Accessed 31 January 2022.
68 https://www.qub.ac.uk/sarc/research/phd-thesis/#mattgreen. Accessed 31 January 2022.
69 http://mgreensound.com/in-hear-out-there-madrid/. Accessed 31 January 2022.
70 https://matildemeireles.com/portfolio/chasing-2. Accessed 1 February 2022.
71 http://143.117.78.104/soundsofthecity/. Accessed 31 January 2022.
72 https://pedrorebelo.wordpress.com/2014/05/10/som-da-mare/. Accessed 31 January 2022.
73 Drawn with gratitude from Patrick Valiquet's fieldnotes, 2013.
74 http://www.augustineleudar.com/research/ and https://vimeo.com/196800389. Accessed 31 January 2022.
75 On CHI see https://sigchi.org/conferences/conference-history/chi/. Accessed 31 January 2022.
76 Interview with John Richards, August 2012.
77 http://www.srl.org/oldshows.html. Accessed 31 January 2022.
78 http://music.york.ac.uk/mrc/na-cm/index.html. Accessed 31 January 2022.
79 Gendron's book followed cultural-sociological studies addressing art-pop crossovers (Frith and Horne 1987; Walker 1987), as well as critical interrogation of the relations between modernism and popular music (Born 1987; Born and Hesmondhalgh 2000). A similar analytical stance is now being developed in musicology, notably by Piekut (2019).
80 Tarde's social theory (1903; Born 2010b) gives a compelling conceptualisation of these processes, which resonate also with Gell's (1998, 218) 'principle of least difference' in his analysis of the evolution of Marquesan artistic styles.

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9

Music and intermediality after the internet: aesthetics, materialities and social forms

Christopher Haworth and Georgina Born

How is the internet changing the ways in which music is made and experienced? In this chapter we provide some answers to this question through an analysis, based on a combination of ethnographic and digital methods, of five prominent internet-mediated music genres that arose in the period from the early take-up of the internet to the present: microsound, hauntology, hypnagogic pop, chillwave and vaporwave. Over the past two decades the internet has fostered a range of escalating transformations that have radically altered the environment for the creation and consumption of music. In the first half, we focus on how the internet has assisted in expanding and transforming the material, discursive and social mediations of each of the five music genres. All of them have substantial internet-based manifestations that strongly condition how musicians, audiences and critics experience them, and our aim is to draw out the complexities manifest in these processes, while forging innovative methodological approaches adequate to these complexities.

Our starting point methodologically is how mediation theory registers the ways in which music's profuse non-sonic mediations (discursive, material and social) together compose a musical assemblage, adding perspectives on how this framework can enhance the theorisation of genre. This provides a framework, we suggest, responsive to music's increasingly profuse mediations in the digital environment. In addition, we employ a digital sociology tool to elucidate the online practices associated with the five genres: the Issue Crawler (IC) software, a

'medium-specific' tool that traces and visualises networks of hyperlinking on the World Wide Web (Rogers and Marres 2000; Rogers 2013; Marres 2015).[1] IC was originally developed to map issue-based controversies online; we adapt it for socio-cultural analysis in order to illuminate the online hyperlink ecology associated with each of the five genres.[2] Using IC to visualise the patterns of exchange of inlinks and outlinks, we trace the nature of the actors, practices and mediations that participate in the online ecology of the five genres. While IC is fruitful, its results demand to be interpreted by reference to other sources of ethnographic and historical material. Through these hybrid methods, we draw out how music's online discursive, material and social mediations contribute to and supplement the experience of musical sound.

We make no claim that the five genres are in any way representative of music in the internet age. Where microsound appears broadly modernist in its focus on a formally reductive, materialist conception of sound, all four later genres – hauntology, hypnagogic pop, chillwave and vaporwave – have been designated postmodern by commentators because of their evocative and ostentatious qualities of nostalgia, irony and even kitsch. Indeed, in certain ways the latter four 'nostalgia' genres are related: in their common aesthetic focus on simulating auditory experiences of the real or imagined past, and in their overlapping social constituencies – connections that prompt some critics to question whether they should even be considered distinct genres. Yet our justification is twofold. What is instructive about the four later genres is that, despite exhibiting a palpable sonic kinship, to a considerable extent their difference as genres is produced, as the IC findings show, by their *non-sonic* dimensions – by other core mediations characteristic of each genre. In this way the relations between the four genres demonstrate key principles of genre theory: that genre identities are relational and in flux, and that their differentiation is produced not by any one privileged mediation such as musical sound alone, but by the particular constellation of mediations characterising any genre. Crucially, comparing the five genres via IC allows us to trace the distinctive contributions made by the internet to each genre, revealing how each manifests a particular moment in the wider evolving technologies and cultures of internet use, as well as how these cultures of internet use are in turn mediated by musical practices. In this way, through music, we add important insights missing from previous research using IC and similar digital research tools: into the internet as an evolving technological environment, and into its diverse and changing cultures of use. In parallel, the ethnography reveals how insistently and reflexively questions of history and time enter into the five

genres. Later, we hold these findings up against the modelling of time and history in two media theories: media archaeology and cultural techniques.

Another result of the comparative ethnographic focus is to allow us, in the second part of the chapter, to develop a series of novel arguments about the aesthetic. We show how the evolving aesthetics of the five genres respond to a heightened engagement with music's expansive materialities, evident in an intensified capacity for intertextuality and intermediality characteristic of the era of the internet's ascendance. In this way we forge ethnographic approaches to the aesthetics of new media that definitively supersede the cinematic formalism established earlier by Lev Manovich (2001).[3]

In examining how recent music genres have engaged with the internet, the chapter highlights, as mentioned, how the internet is itself being mediated by music. In this light, the ethnography that follows – with its focus on multiple platforms and a plurality of practices – proves generative for media theory. For if, pragmatically, we write of 'the internet' as a single entity, we question the inclination to 'reduce the many to the one' (Galloway 2012, 16) in accounts like Kittler's depiction of the computer as representing 'the successful reduction of all dimensions to zero' (Kittler 2010, 227), or Peters' portrayal of the internet as having 'elemental imprint … in some ways close to water, air, earth, fire, and ether in its basic shaping of environments' (Peters 2015, 49). To transcend the formalism, reductionism and elementalism that haunt recent discussions of the internet, we join those who insist that the internet 'is not a single thing … [but] has many referents' (Streeter 2016, 184) and that it is itself an environment that affords, generates and supports multiple modes of mediation (Galloway 2012, 18). As Galloway points out, contrasting concepts of mediation and media: 'a philosophy of mediation will tend to proliferate multiplicity; a philosophy of media will tend to agglomerate difference into reified objects'. Such reifications, he continues, foreclose 'on contingency and historicity' (Galloway 2012, 17, 20) – which, as will become clear, are critically important when tracing music's ramifying lives on the internet. The internet can be understood, then, as an expansive technological environment that encourages the genesis and multiplication of mediations; while human reflexivity about these mediations and the affordances of the technologies coproduce ramifying outcomes.

In selecting the five music genres analysed in this chapter, we aim to convey their intrinsic interest as genres, the diversity of ways in which the internet features in their articulation, and the insights gained by analysing their online existence. As we will show, comparing the IC visualisations

for the five genres makes apparent how the internet both facilitates and intensifies three types of mediation. The net becomes host to numerous new *material* platforms and formats for the production, remixing, publication, circulation and consumption of musical sound, combining an array of synchronous and asynchronous mediated musical experiences. The net affords, moreover, the disintermediation of the legal and extralegal distribution and sale of these and older material forms of recorded music – primarily MP3 files, CDs, cassette tapes and vinyl records. At the same time, the net also hosts a proliferating array of *discursive* and *social* mediations of music. With regard to *discursive* mediation: through its 'agora' functions (Damiris and Wild 1997), the web is used incessantly in many contemporary music genres to cultivate and disseminate critical debate, opinion and knowledge about music via blogs, specialist forums and online publication sites. If music has always been the object of discourse (Born 1995; Kramer 2003; Nattiez 1990), the web stimulates an intensification, expansion and democratisation of this discursivity, inciting participation and speeding up its production and circulation. All the genres except chillwave exhibit this discursivity through a pronounced theoreticism (Born 1995, 42) attached to the sounds by musicians and critics – a theoreticism that indexes efforts to discursively 'thicken' and legitimise the genres. In terms of *social* mediation: on the one hand the net engenders online extensions of entities with an offline social existence – record labels, festivals, concert organisations, performances, funding bodies and so on. On the other hand, it fosters multiple 'natively digital' social forms[4] – notably the 'social worlds' engendered by social networking sites, themselves often entangled with the musically-imagined communities that coalesce around particular music genres.

Two less obvious facets of music's social mediation are particularly striking in what follows. The first is the way in which mundane online fora like listservs, bulletin boards and blogs devoted to music-related issues combine discursive and social mediation – for their participatory discursivity and creativity both depend upon and generate socialities and social imaginaries. We show for microsound and vaporwave how these participatory platforms produce, hybridise and virtualise three of the four planes of social mediation of music theorised by Born (2011, 2012). In coalescing around shared musical affiliations, they generate ardent versions of musically-imagined community (the second plane); at the same time, they stimulate near-real-time, distributed and participatory forms of creativity – virtual analogues of the copresent socialities of musical practice (the first plane). Moreover, such genre-enacting online

fora can also morph into incipient organisational forms (the fourth plane).

A second facet of social mediation evident in the hyperlink patterns revealed by IC concerns the social relations apparently concretised by these hyperlinks. Where previous uses of IC depict hyperlink relations as uniform elements of a networked ecology, we show that it is imperative to probe their differences. The hyperlinking mapped by IC indicates how the actors in each genre tend to be engaged in the bilateral exchange of resources via the mutual attribution of symbolic, cultural and/or economic capital. Moreover, the ease with which actors can participate in hyperlinking suggests that the web accelerates this ecology of mutuality, in which two or more parties co-consecrate one another (Bourdieu 1993, 76–7). The internet's capacity to speed up and intensify the exchange of hyperlinks therefore amounts to an online extension of the inflationary cycle of charisma, prestige and legitimation characteristic of musical and artistic fields, in which actors – artists, intermediaries (critics, managers, agents) and institutions (labels, galleries, concert organisations, festivals, publishers) – participate in a spiral of mutual endorsement and valorisation (Born 1995, 91–4).

However, a striking finding is that the ease of hyperlinking also engenders uses that are *not* bilateral. Bringing ethnographic data to bear on the IC findings points to what might be called *aspirational* hyperlinking: the anticipatory projection by one actor of wished-for relations with and valorisation by another – relations that are not (yet) reciprocated or actualised, but in which the potential for an inflationary cycle is sought.[5] We will show that this is particularly marked among musicians and labels from those genres that aspire to 'cross over' from pop to art, who seek to accrue new kinds of legitimation, symbolic and cultural capital by creating links to established musical and cultural institutions.

If the social relations immanent in this aspirational hyperlinking have a temporal dimension – projecting future relations that do not yet and may never exist – then time also enters into actors' online cocreation of genres. For IC indicates how distinctive kinds of hyperlinks-as-relations temporalise the genre network differently: actors – musicians, critics, labels, festivals – may be engaged in consolidating a genre that is becoming established; or they may be coining and naming what is as yet an emergent genre. Particularly of note is how, in the uncertain period of a genre's emergence, through the combined discursive and social mediation animated by influential critics through their writings and blogs (Mark Fisher for hauntology, David Keenan for hypnagogic pop, Adam Harper for vaporwave) – their ability, by interpreting the situation, to

generate musically-imagined community – such critics accelerate the coalescence of a genre. Of course, the temporality can work the other way, as in the retrospective, teleological hailing by charismatic critics or labels of genres that are taken to have always already been there – but unrecognised.

Part I – Five online musical assemblages: on the entanglement of discursive, material and social mediation

Microsound: 'Formalized music' to pop-art crossover

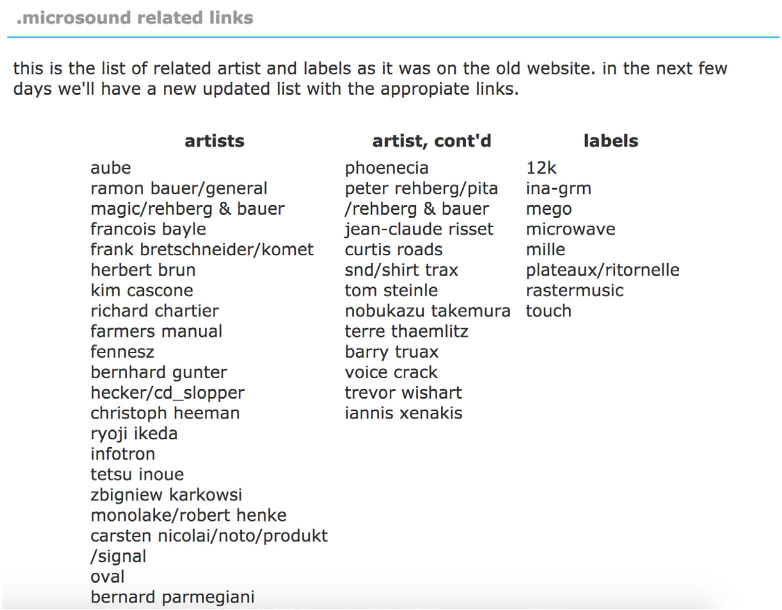
Although we claim that microsound is a genre, this is contentious. In the academic fields of electroacoustic and computer art music, the term microsound has more often been identified with a philosophy, technique or style. Iannis Xenakis coined the term (*micro sons*) in his book *Formalized Music* (Xenakis 1992 [1963]), conceiving of it as a compositional philosophy for modelling sound at microtemporal scales and a set of embryonic techniques to achieve this. Curtis Roads' 2000 book *Microsound* followed Xenakis in its focus on philosophy and technique, while identifying precursors of microsound in the music of Stockhausen, Gottfried M. Koenig, Horacio Vaggione and others. In parallel, however, alternative versions of microsound emerged from the mid-1990s in the work of self-taught, nonacademic musicians working with independent record labels releasing experimental electronic dance music, like 12k, Line and Mille Plateaux. In this scene, that microsound is a genre is also contested. Indeed Kim Cascone, an American composer central to the nonacademic scene, argues that microsound has developed 'without regard for stylistic boundary' (Cascone et al. 1999), while the musicologist Joanna Demers contends that microsound spans genre categories (Demers 2010, 73).

Nonetheless, the coalescence of microsound as a genre was fuelled from 1999 by the creation of a dedicated email list: .microsound (Haworth 2016). Hosted by Hyperreal.org, an online organisation promoting experimental culture with roots in the San Francisco rave scene, the list encouraged musicians involved in an array of popular musics external to academic electroacoustic music – techno, ambient, sound art, glitch and noise – to develop a new aesthetic that was conceived ambiguously as both 'digital' and 'post-digital'. One aim of the email list was to discuss the new aesthetic forms afforded 'by the proliferation and widespread

adoption of digital signal processing (DSP) tools' (Cascone et al. 1999). Such tools developed originally in research institutions, but the rise of affordable consumer music technologies in the 1990s led to their commercial availability outside academia. An example is the GRM Tools suite: developed at the Paris research centre INA-GRM, it offered software tools enabling, inter alia, spectral transformation, granular synthesis, spatialisation and equalisation. With their eventual online circulation as 'warez' (pirated software) on peer-to-peer networks, such tools became ubiquitous in home-studio-produced music; indeed, for some commentators they had become generic, and the sounds produced by them overexposed.[6]

In these conditions, microsound came to be associated with a family of techniques centred mainly on granular and particle sound synthesis and signal processing. Circulating online as research articles, software, patches and code, these techniques became the driving force in the emergence of a microsound aesthetic: timbre-based composition involving the composition *of* often noisy timbres, as well as composition *with* timbre.[7] The link between tools and resulting sound is clearly audible in Cascone's album *Pulsar Studies* (2000). Composed using Curtis Roads' and Alberto de Campo's PulsarGenerator software, the album exemplifies both the microsound sound and its mediation by key DSP tools. Core features are a 'close-up' focus on texture and timbral transformation, a formal orientation to stasis and juxtaposition rather than 'teleological' qualities like development, and an interest in sounds that exploit the thresholds of human hearing. Many of these qualities stem from the aesthetic affordances of the software, notably a detailed sculpting of microtemporal variation at the expense of larger time scales. But the connections between academic and nonacademic scenes forged by the circulation of these and other software packages had further aesthetic effects, fostering novel hybrids of art and popular music genres – micromontage and glitch, minimalism and ambient, electroacoustic music and drone (Cascone 2000; Haworth 2016). By interpreting the IC results through the lens of ethnography and history, microsound emerges as a key genre in which the boundaries between academic and nonacademic computer music, art and pop, have been reshaped.

Microsound's internet-based manifestations grew to encompass two 'natively digital' architectures in addition to the email list: an FTP server and the World Wide Web. The email list, as noted, became a discursive forum in which synthesis and processing techniques, aesthetic ideas and genealogies were circulated and debated. Compared to their pre-net



.microsound related links

this is the list of related artist and labels as it was on the old website. in the next few days we'll have a new updated list with the appropiate links.

artists	artist, cont'd	labels
aube	phoenecia	12k
ramon bauer/general	peter rehberg/pita	ina-grm
magic/rehberg & bauer	/rehberg & bauer	mego
francois bayle	jean-claude risset	microwave
frank bretschneider/komet	curtis roads	mille
herbert brun	snd/shirt trax	plateaux/ritornelle
kim cascone	tom steinle	rastermusic
richard chartier	nobukazu takemura	touch
farmers manual	terre thaemlitz	
fennesz	barry truax	
bernhard gunter	voice crack	
hecker/cd_slopper	trevor wishart	
christoph heeman	iannis xenakis	
ryoji ikeda		
infotron		
tetsu inoue		
zbigniew karkowsi		
monolake/robert henke		
carsten nicolai/noto/produkt		
/signal		
oval		
bernard parmegiani		

Figure 9.1 Screenshot of the original .microsound links page (1999). Image used courtesy of Eloy Anzola, John Saylor, Paulo Moaut, Kim Cascone and the .microsound community.

Credit: Christopher Haworth.

equivalents – music magazines and fanzines – such lists act more generally as sites in which the discursive definition, elaboration and contestation of genres are played out in what has become a vastly expanded discursive field around music. The FTP server, in turn, provided a means to organise a novel type of distributed, time-deferred musical collaboration: the microsound MP3 'projects' page. Using a shared sound file as source material, list members were periodically invited to respond creatively to high-concept 'challenges' issued by other users. The compositions functioned as an online archive showcasing the microsound aesthetic to wider publics. For its part, the web was used by the .microsound list to provide a curated list of URLs for what were deemed representative artists and labels. Combining currently active artists with putative historical forebears, this list portrays a genealogy that defines microsound as a genre (Figure 9.1).

In terms of mediation: as well as stimulating discursive mediation, microsound's internet resources generated an array of social mediations

traversing Born's first, second and fourth planes. The MP3 projects page supported distributed creative practices – an online, time-shifted version of the (first plane) microsocialities of musical practice. The .microsound email list assembled a (second plane) musically-imagined community of musicians, critics and fans who shared their enthusiasm for the genre while negotiating the terms of its identity. But the email list also constituted an incipient fourth-plane organisational form overseen by moderators Cascone, John Saylor and Paulo Mouat, one that oversaw and coordinated those practices, philosophies, works and sounds deemed central to the genre. It was in this burgeoning online environment and through these discursive and social mediations that microsound became a genre, while being further defined by a body of critical literature (Cascone 2000; Demers 2010; Hofer 2014), a set of organological and stylistic regularities derived from the materialities of the computer, and a formalist aesthetic focused on sound as 'material' (Hofer 2014).

Our starting links for the IC map (Figure 9.2) came from the original 1999 .microsound links page of signature artists and labels (Figure 9.1). Comparing the results of the IC web crawl with the 1999 links page reveals that of the 39 URLs originally listed – seven labels and 32 musicians – only nine appear in the resulting map. Five are labels (Raster Noton, 12k, Touch, Mego, INA-GRM) and four are nonacademic, popular artists (Christian Fennesz, Ryoji Ikeda, Mark Fell (SND) and Richard Chartier). As striking is the abundant number of institutions other than labels that appear, confirming the prominence of the genre's fourth-plane social mediations. It is the nature of certain institutions that points to a core finding: the aspirational efforts made by key nonacademic microsound artists and labels to enact a crossover from popular music to art music. They include prestigious digital music and arts festivals like Ars Electronica (aec.at), the Thyssen-Bornemisza Foundation (tba21.org), a major private patron of experimental art, the leading international academic computer music research institutions IRCAM and INA-GRM, and CDMC (cdmc.asso.fr), a French state-funded archive of contemporary art music.

It is in relation to the prominent art music institutions that we encounter the aspirational, one-way hyperlinking practices alluded to earlier in which actors making such links potentialise relations to art music institutions that, if realised, would considerably augment the actors' cultural and symbolic capital.[8] However, to interpret the hyperlinking to these institutions adequately requires closer scrutiny of the inlinks and outlinks associated with them. This shows that although

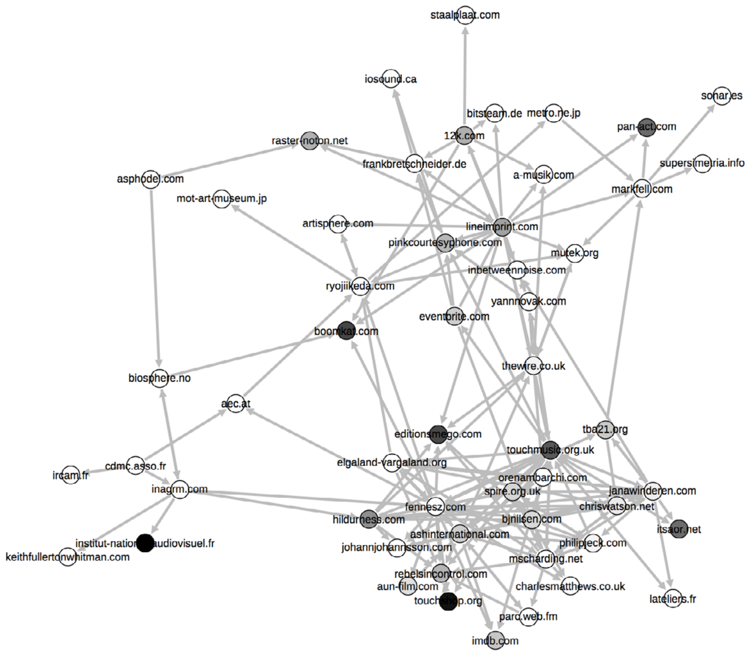


Figure 9.2 Issue Crawler map for microsound.

Credit: Christopher Haworth.

IRCAM and CDMC appear in the IC map, they stay firmly within their own art-musical milieu – for neither makes any outlinks. INA-GRM is different: for as well as receiving inlinks, INA-GRM makes outlinks to a number of nonacademic microsound artists, among them Keith Fullerton Whitman, Biosphere, Christian Fennesz and Hildur Guðnadóttir. This is a highly significant finding: it suggests that some level of robust reciprocal exchange has developed between these musicians and INA-GRM, and that this is not the case with IRCAM. The finding is borne out by two of these artists having held residencies at INA-GRM, while others have been invited in recent years to perform at its Présences Électronique festival.[9] These findings suggest that the drive among nonacademic microsound musicians since the late 90s to establish relations with international academic and art music institutions, thereby forging a pop-art crossover and garnering greater legitimacy for their work, has begun to be achieved.

The presence of the Austrian Ars Electronica festival (aec.at) in the map adds further insight. Its annual prize-giving event, the Prix Ars

Electronica, in 1999 catalysed a major transition: the jury statement denounced the 'ancien regime of [academic] electroacoustic music' for being 'increasingly fixed and rigid … [and] awarding itself an undeserved authority at the cost of cultural irrelevance'. The Prix's Computer Music category was rebranded 'Digital Music', and previously excluded musics made in 'bedroom studios' were explicitly championed, while the microsound-related Mego label gained a Distinction and was lauded for promoting a 'brand new punk computer music' (Eshun 1999). The influence of the microsound aesthetic in auguring these changes was signalled implicitly a year earlier when the head juror Naut Humon commented that 'what is important to "audio sense" is immediate effect rather than narrative progression or perspectival depth'. By setting microsound's 'immediate effect' against the 'narrative progression' of academic electroacoustic music, Humon announced the end of 'thirteen years of cozy electroacoustic [art music] hegemony' (Herrington 2001). These developments opened a rift with academic electroacoustic music, causing high-profile composers to withdraw support from the festival. Two decades on, the rift has been metabolised. In accord with this history, the IC map shows Ars Electronica spanning the pop-art divide, receiving inlinks from CDMC and Fennesz while also linking to the glitch and audiovisual artist, Ikeda. The hyperlink ecology revealed by IC therefore confirms microsound as a key locus for attempts to reconfigure the boundaries between academic and nonacademic computer music – between art and pop.

Equally significant is how the IC map reveals growing links between microsound and adjacent media arts – including audiovisual art, new media art and gallery-based sound art – pointing to burgeoning intermedial practices among microsound artists. If microsound's aesthetic and conceptual kinship with late modernist art has been noted (Demers 2010, 79; Hofer 2014, 300), the presence on the IC map of the Museum of Contemporary Art Tokyo and the (now defunct) Artisphere in Virginia suggest that, since the genre's emergence, these connections have become more concrete. Aided by the heightened profile of sound art worldwide, and the growing celebrity of artists like Ikeda and Fennesz, these links testify to microsound's successful encroachment into the global art world.

The nostalgia genre continuum: hauntology and the unfulfilled promises of the 1960s and 70s

The term 'hauntology' was first employed in relation to music, with knowing reference to its Derridean origins,[10] by the critic Mark Fisher

when in 2005 he wrote a feature on his 'k-punk' blog applying the term to the influential Ghost Box record label. Fisher wrote that records released by the label conjured

> ... [a] sense of artificial déjà vu, where you are duped into thinking that what you are hearing has its origin somewhere in the late 60s or early 70s. Not false, but simulated, memory. The spectres in Ghost Box's hauntology are the lost contexts which, we imagine, must have prompted the sounds we are hearing; lost programmes, uncommissioned series, pilots that were never followed-up.
>
> (Fisher 2005)

A year later the critic Simon Reynolds, writing on his 'blissblog', extrapolated from Ghost Box to describe a whole electronic-music underground. For Reynolds, hauntology described the coalescence of a 'new genre or network of shared sensibility, comparable perhaps to "isolationism"'.[11] Central to this 'shared sensibility' was a commitment to a specific spatiotemporal imaginary: Britain in the 1960s and 70s. Through the sound samples and design aesthetic employed by musicians linked to the genre, hauntology releases assembled a surreal, intertextual melange of post-World War II signifiers that are simultaneously utopian, eerie and cute: new towns, garden cities, public libraries, comprehensive schools, polytechnics, patrician BBC voices, educational television, Penguin books, cult children's television shows, and the sounds of the BBC Radiophonic Workshop.[12]

The philosophical provenance of the term ensured that hauntology was never 'just' a music genre for these writers and their followers. As well as articulating a particular style of electronic music, the concept operated as an instrument of cultural diagnosis and critique attuned to the analysis of the then present. In an article for the leftist journal *Radical Philosophy*, the influential architecture critic and blogger Owen Hatherley wrote that the hauntology aesthetic – with its associations of a forward-looking, optimistic era of British social democracy perceived retrospectively to come to a definitive end with the election of Margaret Thatcher in 1979 – offered an alternative to the prevailing 'austerity nostalgia' industry, exemplified by the 'Keep Calm and Carry On' posters that flooded the UK after the financial crash of 2008. 'Instead of hankering for the past in the context of neoliberalism's unforgiving bull market, [the Ghost Box label's] aesthetic suggests a haunting of the present by the unfulfilled promises of the past' (Hatherley 2009, 4). In contrast to microsound's apolitical abstractions, a particular style of politicised, blog-based discourse, allied

to a dreamlike 'return of the social-democratic repressed' (2009, 4), was hauntology's most prominent non-sonic mediation.

Despite hauntology's fixation on the past, it was very much a phenomenon of the mid-2000s. For it was in the burgeoning channels of the blogosphere that hauntology's dual identity took hold: part music genre, part object of underground theory. Indeed, the genre's rise coincided with the peak of the blog as a cultural form: hauntology was incubated in the Blogger (blogspot.com) social network, a service purchased by Google in 2003. The IC map (Figure 9.3) makes abundantly clear the central role of blogging in the genre. The three most prominent actors are well-known critics: Simon Reynolds (blissout.blogspot), Mark Fisher (k-punk.abstractdynamics.org) and Adam Harper (rougesfoam.blogspot); while several other aspiring writers also appear. Remarkably, the first musical actor to appear, the influential Hyperdub record label, is only the eleventh-ranked actor by density of hyperlinking. In its online life, hauntology therefore vaunts discursive over musical actors.

Indeed, the topography of the hauntology IC visualisation is the inverse of what one might expect such a genre map to look like. Instead of appearing at the centre, musicians (Oneohtrix Point Never), albums (Broadcast's *The Future Crayon*) and labels (Hyperdub, Ghostbox) lie on the periphery, while the blogs of leading critics and other intermediaries that might be expected to occupy the periphery appear as a dense network in the centre. This topography stems in part from the nature of the hyperlinking practices. The IC algorithm privileges the frequent, reciprocal exchange of hyperlinks between actors. The more a group of actors engages in such exchanges, the more they cluster together; while fewer inlinks and outlinks mean that an actor is positioned on the periphery of the map. Generally, bloggers gain prestige according to the number of 'hits' achieved by their blog pages. Hauntology actors using blogspot.com link liberally to each other's posts, both as a citation strategy in the heat of a thread, debate or controversy, and to enact their influence in this discursive-and-social network. As a result, they appear clustered in the centre. This blog-based hyperlink ecology corresponds well to that characteristic dynamic of artistic fields mentioned earlier: the eruption of an inflationary cycle in the accumulation of charisma, cultural and symbolic capital among artists and key intermediaries – critics, agents, impresarios. By intensifying their relations, these actors can collude in a mutual valorisation – a contagious circulation in which charisma is 'passed around a network of interested parties who each have an investment .... [And as a consequence, such charisma] tends to escalate, to be an inflationary currency' (Born 1995, 91–4). Just this process is exhibited in the IC visualisation by the intensive

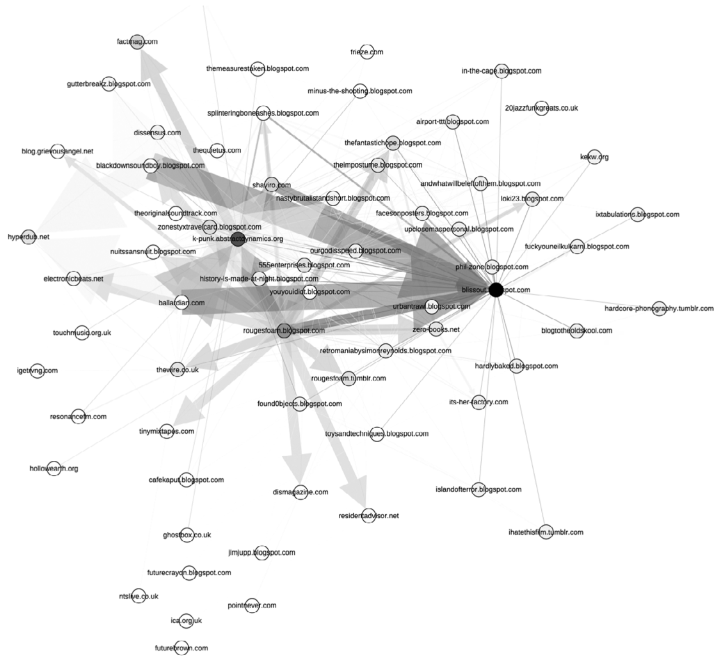


Figure 9.3 Issue Crawler map for hauntology.

Credit: Christopher Haworth.

mutual hyperlinking between critics and theorists invested in hauntology. Examining the hyperlinks made by each actor we see that the blogger, theorist and *The Wire*[13] contributor Adam Harper (rougesfoam) makes around 170 links to Simon Reynolds (blissblog), whilst Reynolds links back to Harper around 120 times. Reynolds links to Mark Fisher (k-punk. abstractdynamics) about 140 times, but the latter links back only five times. As well as ramping up the significance of each other's blogs, these actors also extend their patronage, as befits the 'democratic' orientation of the genre, to less known and anonymous bloggers: to Alex (splinteringboneashes. blogspot), Carl Nevile (theimpostume.blogspot) and so on.

This dynamic inflationary cycle, occupying the centre of the hauntology IC map, is in stark contrast to the restrained practices of the labels on its outskirts. For unless they are run from a blogspot page, which usually indicates a small tape label, hauntology labels tend to link rarely, confining themselves to their own offline economic networks – signalling the particular form taken by hauntology's hybrid, online-offline economy. Although born partly of the need to assert independence from competitors,

this 'autarchic' ethic functions also as a public display of authority – one that applies equally to small-scale enterprises and well-established labels.

What, then, is the extent of hauntology's various mediations as they appear in its hyperlink ecology? Most obviously, IC reveals how prominent is the genre's online discursive mediation, manifest in the dense hierarchy of bloggers and their collusive mutual valorisation. Yet this discursivity also ignites the genre's social mediation, through the mutual catalysis of three planes. First, in the way this discursivity engenders a (first plane) online sociality of reciprocal, inter-referential creative (discursive) practices enacting the competitive prestige economy described. Second, in the guise of a highly developed (second plane) musically-imagined community, one that fuses musical with cultural, political and philosophical associations. And third, through the *substance* of the blog-based discursivity which, centred on the phantasmic figuring of a British social democratic past, (re)activates and refracts ambivalent identifications with a (third plane) social formation – a national imaginary.

Hypnagogic pop: the cassette as palimpsest of sonic memory

If hauntology's nostalgia is for particular cultural elements drawn from Britain's cultural landscape of the 1960s and 70s, then hypnagogic pop (h-pop) animates a similar nostalgia, but with a geo-temporal shift – for the cultural material at the core of the genre is the individualistic, corporate mediascape of the 1980s American west coast. Emerging in part from the American noise, drone and improvisation scenes of the mid-2000s, h-pop took noise's obsession with analogue performance and distribution media in a more narrative direction – as though the media through which music is experienced cannot be dissociated from the cultures in which it acquires its meaning. The h-pop aesthetic therefore rested on a particular material imaginary: it was less about recovering particular 'sounds' that have been 'lost' to digitisation, as in hauntology; rather, it entailed the idea of technology as itself a portal to the past and an inscription of an era's cultural values. Central to this material imaginary was h-pop's elevation of the home cassette and videotape, affordable and portable formats associated with the genesis of home recording in the 1970s and 80s. H-pop artists cultivated a knowing medium-specific aesthetic centred around the material quirks of the cassette format, embracing audio and visual artefacts like tape flutter, hiss, distortion, video moiré, jittery framing and skew error, as well as the effect whereby traces of supposedly 'erased' content remain audible or visible beneath what has been recorded on top. Ironically, these media

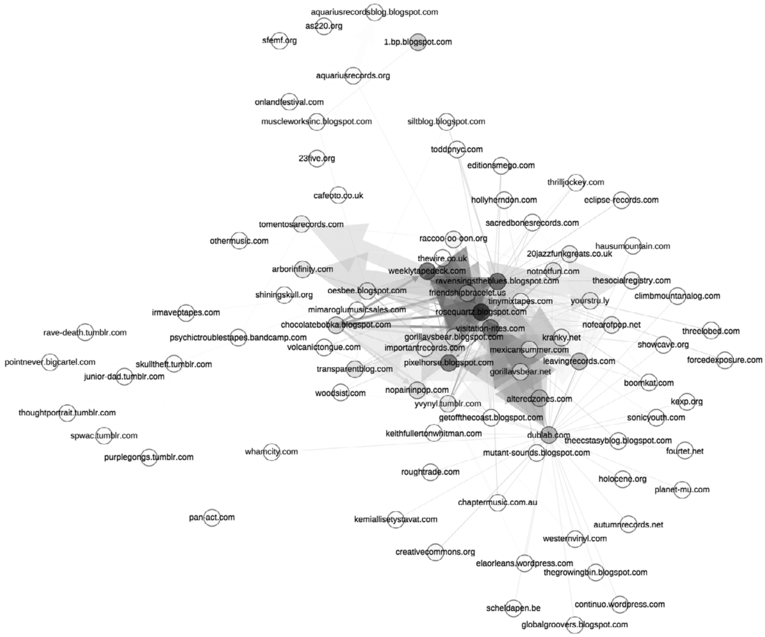


Figure 9.4 Issue Crawler map for hypnagogic pop.

Credit: Christopher Haworth.

effects were often presented in remediated form as MP3s and YouTube videos. In h-pop, these palimpsestic audiovisual layers became mediatic metaphors for memory itself, an abiding theme that can be found in track titles like Oneohtrix Point Never's 'Memory Vague', James Ferraro's 'Memory Theater' and Liz Harris AKA Grouper's album title *A I A : Dream Loss*.[14]

As with the email list for microsound and the blog for hauntology, it was an internet-specific material mediation that catalysed the genrefication of h-pop: the rise of the video-sharing site YouTube, which debuted in late 2005 and within a couple of years became the third-most viewed website on the internet.[15] YouTube drove the internet-based disintermediation of access to pre-existing audio and audiovisual material, offering a platform and a digital archive in which any item of 'digital content' could coexist indiscriminately with others – classical music alongside television shows, home videos, advertisements, underground cinema, rare bootlegs and so on. Indeed, h-pop was fuelled by the new collective sense animated by YouTube that institutionalised

canons and existing genre distinctions could be overturned and reassembled as personalised genealogies – via playlists or 'channels' – as well as distorted, exaggerated or made strange. In this way the h-pop-YouTube assemblage assisted in the birth of the 'web 2.0' paradigm in which such curatorial practices came themselves to be identified as creative – a paradigm soon to be exploited by social media and streaming services (see chapter 5). Thus, in h-pop, affectionately recalled yet derided music genres like new age, exotica and easy listening were mixed with film and TV soundtracks as well as signifiers redolent of American individualism – self-help videos, straight-to-video surf movies, Hard Rock Cafes, gyms and celebrity culture. Such disparate musical and cultural materials became subject to cultural transvaluation through subtle intertextual processes of sonic and generic reframing. Most remarkably, very particular, quasi-'autobiographical' sonic signifiers – the production style of 'Boys of Summer' by Don Henley, the synthesiser sound on 'Hounds of Love' by Kate Bush, the echo on the guitar of 'Big City Talk' by Mark Hunter – were picked out and elevated, their qualities fetishised as defining features of the genre. The aesthetics of h-pop were encapsulated in what became its quintessential artefact, uploaded to YouTube in 2009: Oneohtrix Point Never's 'Nobody Here'. Lying somewhere between a computer game startup screen and a moiréd VHS ident, the track mixed video of a kaleidoscopic rainbow road against a starlight cityscape with a reverb-saturated sample from Chris de Burgh's track 'The Lady In Red', endlessly looped.[16]

H-pop was, then, replete with paradox as a genre: it combined a devotion to the immersive qualities of YouTube with a politics attached to the severely restricted modes of exchange characteristic of the DIY practices of the 1980s, an inheritance from the US noise scene. In h-pop's underground ideology and economy, the lag of mail-order deliveries was privileged over the instantaneous circulation of the internet; 'old' media, like cassette tape, over integrated 'new media' like the audio platform SoundCloud; and the mystique and aura that come from restricted access and information over the noise and information excess characteristic of social media. Although these core genre commitments are in some ways 'anti-internet', they are clearly signalled in the IC h-pop map (Figure 9.4). It highlights a large number of small labels and independent record stores, far more than appear in the other maps. Many are cassette-tape labels run by a single person, such as Leaving Records and Olde English Spelling Bee; while Volcanic Tongue, the now-defunct underground label and store run by David Keenan and Heather Leigh Murray from Glasgow,[17] is another key actor, indexing both the genre's politics of 'independence'

and its transnational imaginary – evident in the fantasised, pleasurable 'psychic tourism' for the California of the 1980s proffered by h-pop (Born and Hesmondhalgh 2000, 35).

However, this sense of an h-pop underground dissipates as we move out from the central cluster on the IC map. Although labels, groups and artists such as Thrill Jockey, Drag City, Kranky, Rough Trade, Planet Mu, Sonic Youth and Four Tet are strong participants in the UK and US alternative music scenes, their appearance on the map along with their diverse genre affiliations – from IDM[18] to noise rock – raises questions about h-pop's distinctiveness as a genre.[19] Some of these nonspecific results are byproducts of the IC method. The musician Four Tet appears, for example, because he has remixed Grimes, an artist loosely associated with h-pop; while Four Tet's influence across indie, folk, improvisation and dance music scenes draws a host of actors from these scenes into the h-pop map. More generally, the clash between the amateur tape labels in the centre and the professional labels on the outskirts of the h-pop map betrays a genre in transition – from underground status in the late 2000s to mainstream indie status by the start of the 2010s. It is h-pop's migration 'overground' that crystallised in the emergence of chillwave in 2009, the focus of the next section in this chapter.

H-pop's main manifestation on the IC map is, then, the storm of tiny cassette labels at the centre, affirming the prominence in this assemblage of a combination of material and (fourth plane) social mediations: how h-pop's preferred medium, cassette tape, forges links between the genre's materialist aesthetic and small independent labels as an institutional form. There is otherwise little specific to h-pop on the map, and the genre appears diffuse, an influential but transitory entity issuing in bifurcating generic directions – chillwave and vaporwave.[20] H-pop's failure to consolidate as a genre attests to its status as a casualty in the increasingly frenetic, competitive repositioning of internet-mediated genres.

Chillwave: indie mainstream and disciplined hyperlinking

Chillwave came to life, like hauntology, in the blogosphere. Coined in a throwaway post by a writer known as 'Carles' on the influential Hipster Runoff blog, the term enjoys a much wider fame than the other four genres. Crucially for the fate of h-pop, certain core artists cited in critics' writings on that genre – Ducktails, Ariel Pink, Pocohaunted – came in due course to be associated with the more popular chillwave.[21] Indeed, it was chillwave's embrace of cassette tape, inherited from h-pop, that fuelled

the wider resurgence of the once-derided medium.[22] Yet if h-pop did not acquire legibility as a genre (Brackett 2015, 195) and was vulnerable to subsumption by chillwave (and later vaporwave), this does not mean that it is indistinguishable from chillwave. Where h-pop embodies a resolutely lo-fi, surreal tape-collage aesthetic, chillwave centres unambiguously on mainstream pop songs in standard verse-chorus form. H-pop's emphasis on the production styles and timbres of past pop epochs remains, but its tape-collage, high-school-mixtape surrealism is absent in the later genre.

Chillwave's mainstream professionalism is strikingly clear in the institutional actors revealed by the web crawl (Figure 9.5): for the IC map renders visible how the key shift between the two genres takes the form of a transition in (fourth plane) social mediation. In marked contrast to h-pop's tiny cassette labels, chillwave is associated with larger established labels like 4AD and Rough Trade. Moreover, the prominence on the map of major ticketing agencies and gig news websites (See Tickets, Songkick) points to chillwave musicians' engagement in international tours – uncommon in h-pop. Equally visible is how chillwave artists operate through international promoters (PCL Presents), make music videos (vimeo.com), perform at large festivals (Green Man, Lowlands, Flow) and commission big name producers to do remixes (Four Tet, The Chemical Brothers). Testifying further to chillwave's 'overground' status is the relative insignificance of discursive mediation – compared to hauntology's theory blogs or the philosophical discourse of microsound – in favour of mainstream promo and publicity channels.

In contrast to h-pop, the chillwave map portrays an established commercial genre. Comparing the two maps makes palpable both their differences, embodied in their contrasting (fourth plane) social mediations, and chillwave's inheritance from h-pop, obvious in the fetishism of a particular material mediation – cassette tape – and in the reappearance of certain actors (Four Tet, Flow Festival, Rough Trade). In keeping with these findings, where the other genre maps exhibit an idiosyncratic sprawl of actors, the chillwave map has a uniform, commercial 'gestalt' evident in the orderly, instrumental linking between labels, festivals, ticketing agencies, radio stations, social media and so on. The disciplined hyperlinking suggests that many of these actors have professional 'site managers' curating their links. Rather than chillwave fully subsuming h-pop, however, the IC results for vaporwave, the fifth genre, suggest that it too retains aspects of the evanescent earlier genre. H-pop, it becomes clear, effectively bifurcated: if chillwave amounts to one trajectory out of the earlier genre, via its conversion into the US indie mainstream, then vaporwave represents an alternative trajectory – mining more deeply h-pop's underground affiliations.

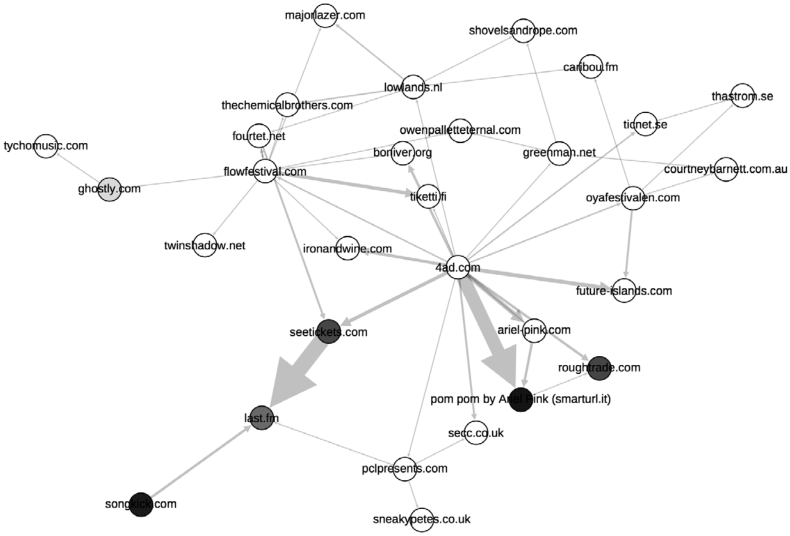


Figure 9.5 Issue Crawler map for chillwave.

Credit: Christopher Haworth.

Vaporwave, interface aesthetics and the reflexive return of the early internet

Vaporwave is the most recent of the nostalgia genres. Like the previous three, it reanimates a historical period or 'past', but with considerable irony the past that it resurrects is that of the late 1990s to the present – the 'digital age'. In comparison with the previous genres, what is remarkable about vaporwave is the extent to which it embraces the internet itself as an aesthetic environment, and one that encompasses the cultivation of expansive, sometimes surreal social and intermedial relations. One sign of vaporwave's engagement with the internet as an aesthetic environment is its focus on visual mediations, which gain much greater significance than in the previous genres. The maelstrom of online images, GIFs,[23] videos and interactive media that people vaporwave's 'interface aesthetic' (Pold 2005) renders sound just another mediation in the wider assemblage. More decisively than in the earlier genres, then, the vaporwave assemblage amounts to a distributed entity in which sound vies with visual media, discourse and online socialities to produce powerfully intermedial aesthetic effects. Yet this expansive aesthetic practice does not produce stylistic heterogeneity. On the contrary: vaporwave's ironic embrace of digitally-native platforms and

practices contributes to an almost excessively coherent genre identity. For in vaporwave, the condition of being a genre – manifest in rigid sonic and visual conventions, a quasi-automatic intertextuality, and an immediately identifiable online subculture – is a primary meta-reflexive concern. Indeed, vaporwave circulates more like a meme than a genre (Shifman 2013; Wiggins and Bowers 2015), its profuse user-generated content fuelled by rapid and contagious imitation (Born 2010a; Tarde 1903).

Vaporwave's aesthetics do not end with sounds and images, but encompass every facet of its online life. The IC map (Figure 9.7 on p. 401) reveals how surreal stylisations of 'net-native' practices – the very activity of making and following hyperlinks, or of surfing from one point in cyberspace to another – are focal for the 'vernacular creativity' at the heart of the genre (Burgess 2007). Indeed, vaporwave's online subculture both embodies and parodies the participatory ethos of 'Web 2.0':[24] it is peopled by pseudonymous avatars that pass for 'subjects', their names comprised of long, unpronounceable strings of symbols and characters, or Japanese translations of English phrases. The genre exhibits a weak separation between producers and audiences, its surreal practices riffing implicitly on notions of DIY or the amateur (Cubitt 1998, 143–44). Moreover, the online subculture is largely coterminous with the genre: there are few offline entities to which it relates. Vaporwave is therefore a startling example both of the extent to which music genres are migrating online and of the effects of this migration in transforming the nature of genre today.

The emergence of the name 'vaporwave' gives a compelling portrait of the life of music genres online. A pun on 'vaporware' – a term for commercial products that are publicly announced but never become available – it first appeared in 2011 in an anonymous post on the experimental music blog and extralegal download site, Weed Temple, where the author used it to describe the sound of the album *Surfs Pure Hearts* by Girlhood. Soon after, vaporwave began to appear as a hashtag accompanying sound files, images, GIFs and other media uploaded extralegally to SoundCloud, anonymous blogs and the online radio station Last.fm. The music's framing by a specific technological imaginary – the 'digital' as medium, age and ideology – was akin to h-pop's; but in this case, a 'hi-fi' multimedia production aesthetic drawn from the 90s was to the fore. Where, in h-pop, the qualities of cassette tape act as a portal for fantasised identification with 80s American consumer culture, vaporwave's knowing aesthetics of the digital draw on the associations of perfect reproduction, transparent 'immateriality' and ubiquity that have

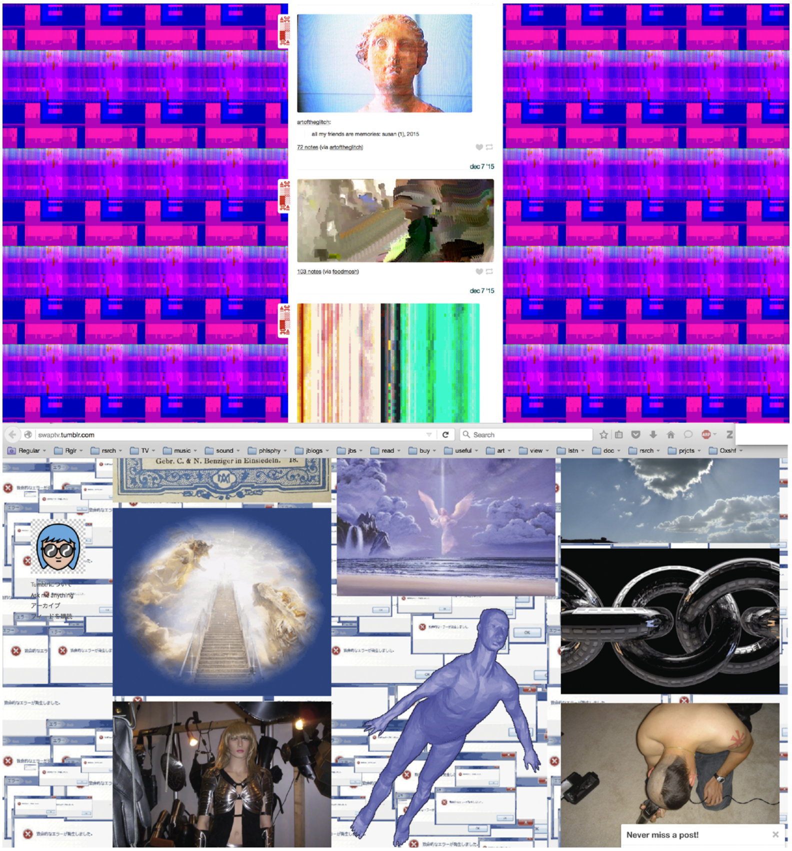


Figure 9.6 Screenshots of swaptv.tumblr.com (top) and glitchgifs.tumblr.com (below).

Credit: Christopher Haworth.

accompanied digital formats since at least the dawn of the CD (Sterne 2012).

James Ferraro's album *Far Side Virtual* is often credited with crystallising the vaporwave sound, and his former role as one of h-pop's main artists and most enthusiastic advocates attests to the continuities between the two genres.[25] At the core of the vaporwave aesthetic is an intertextuality that sits ambiguously between parody and pastiche:[26] *Far Side Virtual* revolves around uncanny parodies-cum-pastiches of genres that are rarely listened to as music – elevator music ('muzak'), advertising soundtracks (especially those for consumer electronics, luxury hotels and other icons of consumer capitalism), computer game soundtracks, sonic

branding and idents, unmodified synth presets and other sonic digital detritus. The music generated by the vaporwave subculture that emerged rapidly on the internet tends to be even cheaper, more cryptic and throwaway than *Far Side Virtual*; these albums often recycle sounds sourced from the internet – crude samples of elevator music, funk, popular jazz, TV advertising music, ringtones and so on. Alongside this intertextuality, vaporwave engages in an expansive intermediality: the album sounds are accompanied by strange visual collages of 90s computer graphics, old home computers and desktop PCs, anachronistic juxtapositions of desktop computers with outdated 3D graphics, retail parks, isolated Japanese cityscapes, and idealised images from Japanese popular culture – images invariably rendered in neon colours (see Figure 9.6). Such albums are rapidly produced (by downloading) and distributed (by uploading), aspiring to evoke aesthetically the experience of surfing the continuous flow of data online.[27]

Despite the apparently 'folksonomic' (bottom up) genesis of vaporwave in the anonymous cyber-underground, its emergence as a genre was catalysed, again, by discursive mediation. In 2012 the critic Adam Harper wrote a definitive essay on the genre for the webzine Dummy, articulating vaporwave's characteristics and bringing the genre to public attention (Harper 2012). Echoing Fisher and Reynolds, Harper drew links between the genre and currents in political theory – specifically, the vogue for accelerationism, a post-Marxist philosophy positing that capitalism should not be resisted but accelerated until it is pulled apart by its own contradictions.[28] Given vaporwave's ambiguous flirtation with both celebration and critique of the aesthetics of late capitalism, along with its absurdist premise of bringing the nostalgia genres' fixation on the past up to the present day, vaporwave appeared an almost-too-perfect manifestation of accelerationist fatalism.[29]

The coherence of the genre is astonishingly clear in the 'gestalt' of the IC map (Figure 9.7), for all of the 100+ actors that appear subscribe to the same amateur internet-based platform: Tumblr.[30] Indeed, the visualisation is an artefact of the idiosyncratic way that the IC software interacts with the Tumblr architecture. In relation to Tumblr, IC has no way of distinguishing between hyperlinks that are intentionally created by a page owner, so as to express a relation, and hyperlinks that are automatically created when a fan or another party 'likes' or reblogs the page owner's page. These 'likes' appear on the visualisation as hyperlinks *back* to the Tumblr page of the individual 'liker' or reblogger, reversing the phenomenon that IC is designed to portray: hence, frequent 'likers' appear on the map as prominent actors, while the actor that is 'liked'

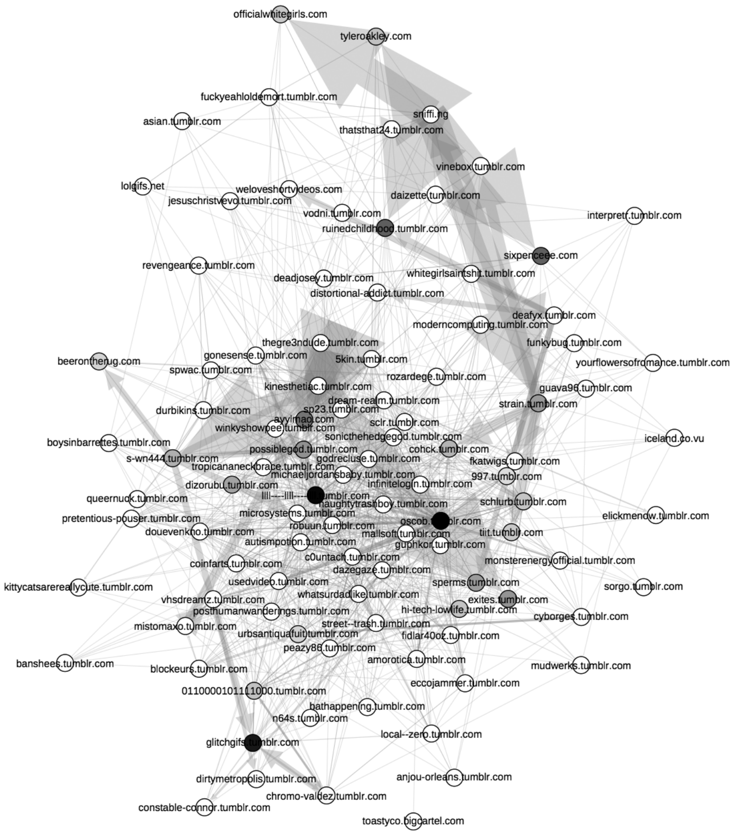


Figure 9.7 Issue Crawler map for vaporwave.

Credit: Christopher Haworth.

may not appear at all. What we see in the map is therefore an explosion of hyperlinking in the guise of congeries of 'likes' for particular tracks, artists and web pages, these 'likes' bouncing vertiginously between the multitude of pseudonymous subjects that constitute the vaporwave subculture. Certain actors like the Bandcamp-based Beer on the Rug label and popular vaporwave artists – OSCOB, Vektroid and James Ferraro – have enduring 'in-world' lives; yet on the map they barely appear, dwarfed by the genre's hyperactive fan subculture. So although featured artists are admired for perfecting the vaporwave aesthetic, participants in the subculture mimic this aesthetic, creating an amateur net art by crudely cloning the characteristic kitsch, multimedia,

collage-based net art in their own Tumblr pages. Moreover, just as fans frenetically 'like' musicians and labels linked to the genre, so vaporwave artists and labels link to fans' Tumblr pages, affirming that fan art has acquired significant prestige. All of this testifies to the horizontal nature of the vaporwave subculture and the permeable border between artists and amateurs. The effect is that the perfect storm of Tumblr 'liking' at the heart of the map pushes other actors – artists and labels, distribution and commentary portals like SoundCloud, Bandcamp and Reddit – to the edges of the map.

The vaporwave assemblage both accentuates and *détournes* the social mediations characterising the previous genres. On the one hand, the IC results point to a highly developed, internet-mediated equivalent of the (first plane) socialities of musical practice in the Tumblr-based creativity emblematic of the subculture – an incessant, distributed collective play. On the other hand, fuelled by the affective contagion manifest in this subcultural play, vaporwave evidences the online genesis of a (second plane) musically-imagined community. As in microsound, the two planes – creative socialities, affective musical public – are entwined. In vaporwave, however, the collective affect is fused with a political project aimed at intervening, reflexively and subversively, in the cultures of internet use. Exemplifying this subversion, rather than an inflationary cycle of hyperlinking between musicians, critics and labels fuelling the mutual accumulation of prestige, in vaporwave such aspirations are rendered surreal. Visible in the results are links to improbable entities like the corporate multinational Monster Energy, signalling an ambiguous endorsement of the jock culture of branded sportswear and high-energy drinks. Here the act of linking parodies the aspirational linking of microsound's actors, satirising the insubstantial and inauthentic nature of such online connections.

Vaporwave's intense, recursive material and citational reflexivity in relation to the internet amounts to a limit case for our use of IC. For the genre is a fully net-immersive phenomenon: in vaporwave the net has itself become the source of content as well as the medium for creativity, communication, circulation and sociality. As a genre, vaporwave is partly 'about' the cloud tags, hyperlinks and networks that IC visualises. Moreover, in vaporwave, IC does not portray subjects, entities and practices that have another existence offline. The pseudonymous avatars – ruinedchildhood.tumblr.com, sonicthehedgegod.tumblr.com, whitegirlsaintshit.tumblr.com, hitechlowlife.tumblr.com etc. – *are* the actors, and these names change constantly in celebration of the anonymity and flux of cyberspace. It is the heightened capacity for simulation

afforded by the net that vaporwave exploits through its intertextual and intermedial play with the texture of 'virtual life'. These are radically different and expanded uses of the net to the earlier genres; in this way vaporwave dramatically highlights the coevolution of internet technologies and the cultures of their use.

Part II – Intertextuality and intermediality online: on post-internet materialist aesthetics

In the second part of the chapter, we cut the ethnographic material differently. We pursue the insights derived from the Issue Crawler maps through ethnographic data sourced in other ways, seeing how the five genres look when starting out from different entities. We extend themes thrown up in the first part: notably, the intimate interrelations between the five genres' material, discursive and social mediations – how in h-pop, for example, a paradoxical materialist aesthetic (cassette tape plus YouTube) is entangled in ideological commitments (DIY anticommercialism) and an institutional form (tiny labels). Labels come to the fore as crucial actors in what follows, in their experimentation with music's institutional, economic and material forms, and in their curatorial and aesthetic personae. We therefore continue the ethnographic theme of the entanglement of music's mediations, but press this further to address a core conceptual challenge: how to analyse the aesthetic in internet-mediated music genres.

Projects, micro-labels and hybrid spin-offs: curating music's institutional forms after the internet

To begin with, probing the record labels associated with the five genres points to additional facets of music's social mediation after the internet. In what follows we uncover a lively experimentation among labels linked to the genres – an experimentation that is at once commercial, organisational, material, ideological and aesthetic, to the extent that disentangling these components is challenging. In all cases we see a heightened reflexive concern with curating both music's *material* forms and its *organisational* forms, a reflexivity attesting to widespread awareness of their cultural-historical connotations. Thus, the choice of music's material format for release and sale has become a preoccupation that is at once commercial, ideological and aesthetic; while the net encourages a merging of previously distinct organisational identities,

along with a sensibility attuned to experimenting with and curating new institutional forms – 'projects', 'spin-offs' and 'micro-labels'.

The labels exist along a spectrum of scale and commercial strategy. The chillwave- and microsound-associated 4AD, for example, despite ostensibly being an 'alternative' label, pursues large-scale production and distribution, integrated into the industry mainstream, with 103,000 followers on Twitter. Grimes, a leading 4AD artist, sold 11,000 copies in the first week of the release of her *Art Angels* album, and the album reached number one in the Billboard alternative music charts. At the other end of the spectrum are those small-scale labels that engage purposefully in strictly limited releases, cultivating a restricted circuit of production, circulation and sale. Thus, the h-pop-associated label Three Lobed Recordings publishes limited editions of cassettes (between 200 and 2000 for a Jack Rose album) and has just 3,000 Twitter followers. Even smaller labels issue single-digit runs of cassettes or CD-Rs that tend to sell out instantly; many of the tapes released on the h-pop label Irma Vep Tapes by the artist Kommissar Hjuler Und Frau, for instance, are published in single digits. In Kommissar's case and others, a bigger label may later step in to reissue their out-of-print cassettes in a compilation (as the label Domestic Violence did with Kommissar). Digital-only labels like hauntology's Café Kataput, in contrast, eschew physical releases altogether – a paradoxical strategy for hauntology, given its aesthetic commitment to older physical-material formats.

All the labels linked to the five genres are owner-run, 'independent' businesses, although their scale of operation differs, as does the extent to which they have arrangements with other labels and distributors. Despite these differences, all the labels have adopted the strategy of direct purchasing through their website. For smaller labels, this is in part economic necessity (being unable to afford an international distributor), with knowing roots in DIY culture, while for established labels it offers additional ways to curate and sell the catalogue alongside offline and virtual stores. Among 4AD and other microsound labels, catalogue items began to be sold via label websites in 2004. Warp Records' Bleep store led the trend, going online with an MP3 store in 2004, and Touch, a key microsound label, launched its TouchShop soon after. Both 'shops' have expanded further to become general online stores that sell both physical and digital releases of associated artists and labels. Since the advent of Bandcamp in 2013, one of the leading digital download stores, most labels have added this outlet as a digital sales platform; SoundCloud and YouTube, in contrast, are favoured for promotional purposes. Smaller labels, notably those associated with

h-pop (e.g., Beer on the Rug, Olde English Spelling Bee, Irma Vep), continue to sell exclusively through their websites, often distributing physical formats by mail order in knowing reference to pre-digital distribution networks.

A similar spectrum of scale and strategy exists in distribution arrangements. The range of international territories that a label can reach via deals with independent distributors is a key marker of its scale and commercial influence. Among the larger labels, chillwave's 4AD (at the centre of Figure 9.5) is fully owned, and Rough Trade fifty per cent owned, by Beggars Group: an international network of labels that grew out of the post-punk label and record store Beggars Banquet, which has offices in the UK, USA, Canada, China, Greece, Italy, Belgium, Netherlands, France and Japan. The labels associated with microsound and hauntology have similar arrangements with shops, distributors or other labels. Hence, the microsound-linked labels 12k, Line, Editions Mego and Raster Noton distribute their products through a range of international outlets: A-Muzik in Germany, Forced Exposure in the US, Kudos in the UK. At the other end of the scale, Not Not Fun, a small LA-based label associated with h-pop, distributes its cassettes and LPs through just one distributor – Revolver/Midheaven. It is only the tiniest labels like Beer on the Rug, Psychic Troubles Tapes and Irma Vep that do not have international distributors, distributing internationally through their own websites. A clear outcome of the move to online stores is therefore that the previously distinct organisational identities of independent label, store and distributor are increasingly blurred. Hence, the Manchester-based Boomkat (h-pop) describes itself as an 'online store', yet it ships products internationally; while Forced Exposure (also h-pop) provides an identical service, yet describes itself as a 'distributor' – perhaps a legacy from its pre-internet days as a mail order company.[31]

Labels commonly develop spin-off companies in the form of micro-labels with more specialist musical focus, book publishing companies, or artist-led curatorial projects. Ghostly International, for example, which appears on the chillwave map, has a dance music imprint called Spectral Sound; while Editions Mego has a number of curated sub-labels: an indie imprint called Spectrum Spools handled by John Elliot of drone band Emeralds, a dance music imprint called Sensate Focus curated by Mark Fell, a new music/avant-garde reissue project called Ideologic Organ curated by Stephen O'Malley of Sunn O))), and an archival/reissue project for GRM recordings called Recollection GRM.[32] Such a reticulate, nested practice of projects, spin-offs and micro-subsidiaries, each with their own aesthetic sensibility and artistic identity, attests to the existence

of an exquisitely attuned, reflexive curatorial sensibility, beyond commercial functionality, oriented to cultivating novel institutional forms to enable music's production, circulation and sale. At the same time it testifies to an acute collective awareness of the cultural-historical and social significance of such institutional forms in the history of popular music.

H-pop's Volcanic Tongue: record store/label/distributor as mediator and aesthetic persona

To exemplify the heightened reflexivity attached to music's (fourth-plane) institutional forms, as well as the merged identities of independent label, store and distributor, we zoom in on the Glasgow-based Volcanic Tongue, a prominent player in the promotion of h-pop. Volcanic Tongue appears in the h-pop map (Figure 9.4) because it is linked to by a handful of key actors associated not only with h-pop but with underground music in general: labels Olde English Spelling Bee and Root Strata, artists Raccoo-oo-oon and Kemialliset Ystävät, the blog Raven Sings the Blues, and the internet radio show dublab. However, its influence extends much further than is represented on the map. The store was founded by David Keenan, a musician, critic and author whose 2003 book *England's Hidden Reverse* mapped the 'English Underground' from the late 1970s to the 90s through histories of the industrial groups Nurse With Wound, Coil and Current 93. Keenan is also a prominent contributor to *The Wire* magazine; as noted earlier, it was his 2009 article 'Childhood's End' that coined 'hypnagogic pop'. Between 2004 and its closure in 2015, Volcanic Tongue was a key node in the circulation of avant-garde and esoteric popular and crossover musics from all over the world, acting simultaneously as physical store, online distributor and occasional record label. Its weekly email commentary, containing a 'Tip of the Tongue' spotlight on a particular album, came to exert a significant influence on underground music, to the extent that by the early 2010s the featured releases were taken up almost immediately after publication, appearing in online radio playlists, blog posts and music folders shared extralegally on key file-sharing websites.

Volcanic Tongue's email updates accomplished a highly influential discursive mediation of the music recommended and sold, while also manifesting a curious play with historical time. Mixing new pressings and secondhand acquisitions of rare and hard-to-find recordings by artists from the early 1960s to the 90s with audibly similar, lo-fi releases by contemporary artists from Europe, North America and Australasia, the

historical provenance of the albums being promoted was often difficult if not impossible to discern. This was compounded by the fact that both contemporary and historical items were shrouded in a deliberately obscurantist aura, the sources of the secondhand and reissue items often withheld; and because the new products tended to be fiercely limited in number and confined to vinyl, cassette and CD-R (eschewing downloads), they were often 'reissues' when they came back in stock – despite being just a few years old. Regulating all of this was a highly selective acceptance policy which, encompassing *musique concrète*, free jazz, garage, sound poetry, drone, noise and psychedelia,[33] was often referred to simply as 'the VT aesthetic'. In the email updates Keenan would breathlessly extol the virtues of particular releases in terms of their fidelity to this collusive sonic sensibility, for example: 'in many ways this amazing LP [*Stoned Rehearsal* by New Zealand garage band The Garbage and the Flowers] perfectly captures the *VT aesthetic*; devolved rock music with a cracked audio-verité edge and a ton of heart'; and '[if] you're in any way tuned in to the whole VT aesthetic then you *need* this' [the reissue of Vertical Slit's 1977 LP, *Slit And Pre-Slit*].[34]

The case of Volcanic Tongue therefore highlights the contributions made by deliberately restricted release and circulation and the drawing and regulation of musical boundaries to the generation of value and cultivation of desire in underground music scenes. For an album by an h-pop artist to make an impact, it had first to pass through a network of tightly restricted circuits: the curatorial lenses of label, record store and distributor; the constraints imposed by material format (cassette, vinyl) and by limited edition release; the review pile and sensibility of a writer at *The Wire*, and so on – accumulating at each stage more cultural and symbolic capital in another, posthuman version of the inflationary cycle of prestige and legitimation (Born 1995). In the case of Volcanic Tongue, all of these stages contributed to the cultivation of its singular market in symbolic-and-economic goods: its obscurantist, strictly limited-edition historical and contemporary physical releases; its critical discourse-cum-product endorsements authored by a pivotal underground critic; and its strenuous efforts, through these material and discursive techniques, to define and promote an emergent aesthetic.

Labels and the aesthetics of the format

That key labels associated with the five genres are themselves engaged in the definition and cultivation of a particular aesthetic can be further connected to the ways in which they release music on an array of material

formats. The rationales for favouring one format over another and for releasing on serial formats combine, as noted earlier, commercial strategy and material-aesthetic ideologies. The mix of releases in each format may also change over time. Editions Mego, for instance, released music primarily on CD in the 90s and early 2000s, along with the occasional 12-inch vinyl and VHS. More recently, its releases are mostly on vinyl and digital download, though it continues to publish across the spectrum of formats. In many cases, and a sign of the heightened post-digital condition, a label's format strategy attests to its participation in developed material-aesthetic ideologies – what might be called an *aesthetics of the format*.

The CD format persists, despite predictions of its obsolescence. Almost all of the microsound labels release on CD, perhaps following the material-aesthetic dictates of the genre's 'digital aesthetic', which demands a high-quality digital medium. Yet invariably, these labels contradict their sonic connoisseur ideology by also offering compressed MP3s. Indeed, with few exceptions, all the labels associated with the five genres offer their music as digital downloads from their websites, and many have partnerships with Bandcamp. The prominence of the CD format in chillwave seems to derive, in contrast, from a commercial strategy aimed at the market in affluent 'older music buyers': those who don't respond to vinyl because they are too young to have bought a turntable the first time around and not cool enough to have bought one when they came back in fashion. Larger labels such as 4AD and Rough Trade may publish in both CD and vinyl to satisfy the bifurcation in audiences; while smaller labels often specialise in one format, although this may shift over time. Releases on Editions Mego and Raster Noton typically oscillate between digital formats and vinyl, with cassette tape, DVD and other nonstandard formats also occasionally being issued.

The resurgence of vinyl in the past two decades adds further insight. Historically, for a series of aesthetic-ideological reasons, independent artists and labels have championed the vinyl LP as music's 'true' format – even for music created entirely digitally, like electronic dance music (EDM). Despite vinyl being more expensive to print and transport, harder to master from an audio engineering perspective, and more prone to defects, labels apparently choose the medium to demonstrate their commitment to listening experience over sales. Statements and interviews published on label or artist websites invariably emphasise a commitment to quality over commercial gain.[35] Such a material-aesthetic ideology is prevalent among many labels associated with microsound and hauntology, and it is intensified among the purist h-pop labels, like RVNG

Intl. and Irma Vep Tapes, that publish only in one medium. The implicit message is: if you don't have a record player or cassette deck, you aren't one of us and we don't want your cash. Paradoxically, the cachet associated with vinyl has decreased in recent years due to its increasing ubiquity, with 'classic' albums released on LP being stocked in generic grocery chains.

It is cassette tape that hosts the most ideologically-imbued aesthetics of the format. Labels associated with h-pop invariably publish exclusively on tape, as befits the lo-fi, palimpsestic sonic signature of h-pop artists. But tape is also a practical, affordable medium that can repeatedly be copied at home. Indeed, the h-pop labels are the inheritors of the earlier noise labels that in the early 2000s published on CD-R – also a cheap DIY medium. In turn, both the h-pop and noise labels gesture back to punk's DIY self-production ethos (Laing 1985). Despite these exquisitely honed aesthetic sensibilities attuned to material formats, it is striking that some retro formats fall completely off the aesthetic agenda: thus, none of the labels on the five genre maps now publish on CD-R; digital downloads and the cassette revival have squeezed it out. More than commercial strategy, the waxing and waning of formats like the CD-R attest to changing material-aesthetic ideologies.

Aesthetic-and-social entities: artists as multiples, labels as aesthetic personae

If the choice of material format for release speaks to the aesthetics of the format preferred by particular record labels, affirming how labels themselves cultivate a type of aesthetic persona, then the cultivation of this aesthetic persona occurs additionally through the relations developed between labels and musicians. Disturbing the assumption that it is the artist as creative subject who brings her or his characteristic sound to the label, which then plays the role of curator, we suggest that the situation is better understood as one in which two entities – artist and label – are engaged dynamically in construing relations akin to what A. N. Whitehead called prehensions – a process whereby the potentiality immanent in an object is 'actualised' by the subject in a process of cocreative becoming concrete (concrescence) (Stenner 2011; Whitehead 1967).[36] In what follows we exemplify the mutual prehensions between artists and labels, and the concrescence manifest in the resulting musical sounds, through major artists from the microsound map: Mark Fell and Keith Fullerton Whitman. Rather than unified creative identities, both have multiple musical personae distinguished both by the adoption of different aliases

and by associating each alias and its sound, as a 'project', with specific labels.

Mark Fell is one half of the influential electronica duo SND, whose stripped-down minimal techno has been released by the German electronic music labels Mille Plateaux and Raster Noton. Both labels have a heavily formalist orientation towards minimal electronica genres like glitch, microsound and minimal techno, and both have a distinctive visual aesthetic. Raster Noton, however, has also moved towards sound art and multimedia projects in the last decade. More recently, Fell has produced work under his own name for Editions Mego, as well as for a series of labels – Alku, Pan, Raster Noton and others. While sharing the same minimalist aesthetic as SND, Fell's solo works tend to be distinguished by their fidelity to a particular concept or musical process. In this sense they are closer in attitude to the sound installation works that Fell has produced since the late 1990s under his own name for art galleries. (It is this body of Fell's work that lies behind the outlink made to Fell by the private arts patron Thyssen-Bornemisza Foundation in Figure 9.2.) In addition, Fell releases music under the name Sensate Focus on an Editions Mego-affiliated sublabel of the same name. Closer to early house music than the minimal techno of SND, it shares with his other projects a focus on unconventional rhythm.

Describing his solo albums *Multistability* (Raster Noton, 2010) and *Manitutshu* (Editions Mego, 2011), Fell commented:

> I actually conceived of [them] from the very beginning for a specific label. Like the album for Raster Noton, from the very get go, was always going to ideally be on that label, and the same with the Mego one … From my point of view, it's a response to their output. So [Ryoji] Ikeda, who's one of the biggest artists on [Raster Noton]: I will hear his music and think, 'This is good, but this is how it can be better!' … I'll think, 'Yeah, he's done that, but I'm going to bounce it back with a few modifications.'[37]

Fell's response to the two labels therefore takes the form of a subtle creative dialogue with their respective back catalogues, a back and forth whereby a concept or aesthetic associated with the label is appropriated and extended or satirised. In the case of *Multistability* on Raster Noton, the most obvious reference is to the minimal data sonifications of Ryoji Ikeda. Like Ikeda's *Test Pattern* and *Dataplex*, the track titles on *Multistability* are designated by number as though they are a series – 'Multistability 1-a', 'Multistability 2-a' and so on; and like Ikeda, Fell uses

basic pattern-generating systems. The works therefore have both a sonic and a conceptual kinship. Yet where Ikeda commonly relies on basic timbres – pure tone bursts, white noise, clicks and drones – Fell's patterns are synthesised using the richer, time-varying spectra of frequency modulation synthesis familiar from his work with SND. Fell also manually interrupts the precise rhythms in real time in production, giving the tracks a sense of swing or occasional aperiodicity that is absent in Ikeda's sound. As such, it could be argued that *Multistability* humanises Ikeda's machine aesthetic, while at the same time evolving the sound of the label Raster Noton, bringing it closer to genres like deep house. The mechanism is mutual prehension: Fell in dialogue with Raster Noton via its artist Ikeda, and Raster Noton 'curating' Fell because of the aesthetic affinity of projects like *Multistability* with the label's output.

Fell's album *Manitutshu* for Editions Mego explores the same basic elements familiar from *Multistability* and other works. It uses a limited palette of sounds associated with EDM (no more than hi-hat, kick drum, synth and snare drum), the parameters for which are tightly coupled and driven by algorithms that are often modified in real time. However, it differs from *Multistability* audibly in several key respects, some of which can be attributed to the mediating influence of the label – Editions Mego. First, the role of the instrument used on the record is foregrounded, both conceptually and aesthetically. It is in keeping with a longstanding Mego tradition that *Manitutshu* (and the earlier *UL8*) is mediated discursively by 'realist' paratextual commentary detailing the technologies and processes used. The label website explains that Fell was invited to design some 40 presets for a new Native Instruments software synthesiser, which the album explores, and each track title references an arcane studio detail pertaining to the track; (hence, track 2.2 is called 'Manitutshu … parameter set 2, Linn HI Tom, JazzOrg, vortex study performance overdub, and synthesis reminiscent of Duet Emmo').

The second major departure from *Multistability* is that *Manitutshu* is sonically more exploratory, even improvisatory, than the earlier album. Although periodic rhythms and riffs feature, the link with house music is looser and more abstract. Some of the patterns are allowed to continue for longer than they would on *Multistability*, and the arrangement is often sparser, with attention focused on the variation of more subtle, microsonic details. A third, related departure is that *Manitutshu* makes explicit (and perhaps ironic) aesthetic links to the traditions of academic electroacoustic and computer music that Editions Mego are famous for flirting with, and in which the label is now directly involved via its Recollection GRM series. The tracks feature tongue-in-cheek spoken

introductions in French, referencing *musique concrète* ‘radio concerts’, and many of the titles riff on the titles to *Acid in the Style of David Tudor*, a pivotal 2009 Editions Mego album by Florian Hecker that ironically foregrounded the sonic connections between ‘high’ experimental art musics and ‘low’ techno. Across the two albums, *Multistability* and *Manitutshu*, we see a subtle but decisive reorientation of Fell’s aesthetic, in both cases attuned to a specific label, responding to and extending each label’s sound world – aesthetic shifts that derive from mutual prehensions between artist and label. These shifts amount to far more than merely instrumental links between commercial partners; rather, label and artist are entangled in deciphering and propagating the future life of the sounds and genres at issue through a cocreative becoming concrete – the resulting album its concrescence.

Keith Fullerton Whitman is another electronic musician whose activities display a keen awareness of the work of aesthetic mediation performed by record labels. Earlier in his career, in keeping with the late-90s convention for techno artists to adopt multiple personae (Hofer 2006), Whitman delegated different musical projects to different aliases – most famously Hrvatski, a breakcore project associated with various electronica labels, but also aliases ASCIII and Anonymous (Hofer 2006, 10). In the mid-2000s, Whitman dropped the aliases to focus exclusively on works under his own name. His output since remains generically diverse, encompassing live improvisations with analogue synthesiser, laptop improvisation, and ‘plunderphonic’ revisions of chart music (Oswald 1985). Yet the greater emphasis on concept and process in these practices pushes them away from the electronic dance music of Hrvatski and towards art music genres like *musique concrète*, *elektronische Musik*, early computer music, field recording and minimalism. This plural musical output has been released on an array of different labels including Pan, Editions Mego, Kranky, NNA tapes, Planet Mu and No Fun Production.

In October 2002, Whitman released two albums of electronic music within two weeks – *Swarm and Dither*, under the Hrvatski alias, and *Playthroughs*, as Keith Fullerton Whitman. Sonically and conceptually, the albums were poles apart. *Swarm and Dither* was a playful hybrid of electronic dance music genres like breakcore, drum & bass, electronica and ambient. Composed and arranged over an eight-year period, its mixture of complex drum-programming, diatonic melodies and timbral exploration served to ally the album, according to most critics, with the then-peaking genre of IDM, although related genres like post-rock and folktronica were also cited in reviews. In contrast, *Playthroughs* was a more stylistically unified album. Recorded for the most part in real time

using a guitar and a Max-equipped computer, its slow-moving drones evoked the minimalisms of Terry Riley, La Monte Young and Éliane Radigue. Furthermore, the discursive and paratextual framing of *Playthroughs* was subtly different. In interviews and on his website, Whitman went into great technical detail describing the software system and compositional processes he devised to create the album. Coupled with the use of his given name, these factors seemed to establish the record as the mature, 'art' counterpart to the irreverent, popular-identified techno of Hrvatski.[38]

Crucially, the distinction between the two projects was not produced by discourse and sonic aesthetic alone, for Whitman also worked with different labels for each record. *Swarm and Dither* was released on the UK's Planet Mu label, which specialises in electro, dubstep, grime, IDM, drum & bass and electronica; *Playthroughs* was issued by Kranky, a Chicago-based experimental music and sound art label specialising in psychedelia, ambient and experimental music. When the two records were released, retailers and music magazines were not sure how to market them. The online store Boomkat listed *Playthroughs* as 'Modern Classical/Ambient' and *Swarm and Dither* as 'Electronic', treating each as essentially separate products and orienting them to distinct genre communities.[39] *The Wire*, on the other hand, grouped the two together in the same review, assuming that readers would want to follow the author rather than the genre. When Whitman toured the UK in 2003, he played separate sets for the same audience, devoting the first half to material from *Swarm and Dither* and the second to material from *Playthroughs* (or rather, music created using the same software system). With both albums sitting beside one another for sale on the merchandise stall after the show, the spectacle posed the question of what difference the relation with a particular label is intended to enact.

Like Mark Fell, Keith Fullerton Whitman therefore exhibits multiple aesthetic identities, identities that have in part been elicited and coproduced by cultivating relations with the distinctive aesthetic personae attributed to chosen labels. In turn, each label's aesthetic persona is curatorially honed through relations cultivated via new projects with specific artists, and via the aggregate label-identity-effect produced by the evolving roster of projects, releases and artists. While label managers do not always welcome the idea that labels can be the bearers of an aesthetic, colloquial terms like 'Raster Noton aesthetic' and 'Mego sound' circulate widely in fan discourse, and are sometimes invoked by critics as well. It is therefore undeniable that both artists and fans make similar pragmatic uses of vernacular associations between

labels and particular aesthetics. That these associations are *legible* (Brackett 2015, 195), informing discourses about music as well as musical practices, puts pressure on any claim that labels operate free of aesthetic-ideological agendas. What is clear is that the alternative markets and distribution networks that artists seek through affiliation to prestigious labels like Kranky, Mego or Raster Noton or, in h-pop's tiny underground economy, Irma Vepp or Olde English Spelling Bee are accompanied not only by the accrual of symbolic and (sub)cultural capital but by the genesis, via mutual prehensions, of new aesthetic potentials. In each case, artists' orientation to such labels is manifest in subtle acts of sonic, conceptual, material and paratextual differentiation, markers of aesthetic sensibility relative to the histories of each label that are recognisable to connoisseurs. Such label differentiation is as much *creatively productive* as instrumental, for it protends or makes possible distinctive sound worlds, catalysing their emergence, blossoming or prolongation.

In the ways discussed, through mutual prehensions between label and artist, the potentiality immanent in both comes to be actualised in the concrescence of particular projects, in which the label's contribution is both social and aesthetic. At the same time, both Fell and Whitman enact efforts at crossover between pop and art in part by distributing their musical identities across different labels identified with each side of the pop-art boundary, allowing the connotations attached to these fourth plane entities to work on and with their musical output. It bears stressing that the complexity of the artistic biographies of Whitman and Fell far exceeds the analyses given here, attesting to the remarkable array of projects in which they and other artists are now engaged. In such circumstances it is the label that is rendered the 'simpler', more unified aesthetic subject, while artists may relish the licence to abandon any restrictive humanist illusion of authentic, unified musical subjectivities.

From the aesthetics of the format to intermedial intertextuality

A final challenge in analysing the materialist aesthetics of the five genres at the centre of this chapter is the need to decipher how creative practices entail, and aesthetic experiences depend upon, relations set up between and across different media and formats. Since the emergence of the nostalgia genres, certain music writers have emphasised the strong connections between media, aesthetics and memory (Fisher 2014; Keenan 2009). Specific media, they contend, act as carriers of emotional

associations, as with mixtapes and home video recordings; as bearers of collective memory, through the experiences associated with the heyday of particular media (vinyl, cassette tape, CD-R and so on); and as focal aesthetic signatures, as material quirks like tape skid and vinyl crackle are foregrounded to become sonic motifs (cf. Brøvig-Hanssen 2010; Brøvig-Hanssen and Danielsen 2016).

Underpinning these interpretations, problematically, is a tendency to assume that the analysis of these genres' aesthetic engagements with media is exhausted by a focus on one privileged medium – vinyl for hauntology, cassette tape for h-pop, digital formats for vaporwave. Yet paradoxically, as we have shown, the release formats favoured by labels associated with the five genres often fail to coincide with the privileged medium of the genre's aesthetic imaginary. Moreover, even when they do coincide, the limited distribution of the analogue medium (vinyl, cassette tape) means that the majority of listeners will experience the music through the remediation of the analogue medium by MP3 downloads culled from anonymous blogs or via YouTube. Rather than a mediatic metaphysics of presence, in which the 'original' medium is sacrosanct, inviolably present in unremediated form, what results is a practice of nested mediations: vinyl crackle remediated by DVD, cassette tape remediated by YouTube audio-visuality, tape flutter remediated by MP3. It is, then, insufficient to reduce these musical assemblages to a focus on one medium. Instead, through closer analyses of h-pop and vaporwave, we want to indicate the productivity of tracing how aesthetic experience is distributed across several media.

H-pop, as noted, is associated with the cassette tape, a lo-fi medium the commercial peak of which followed the rise in the early 1980s of the Sony Walkman, the first miniature portable music player. Some of h-pop's formal characteristics as a genre are a direct product of the technical affordances and material qualities of cassette recording and playback: crosstalk, tape flutter, manual punch-in/punch-out record, distortion, hiss and other traits. These sonic quirks signal more than an apolitical aestheticism, for they arise from cassette tape's cheapness and portability – the same attributes credited with empowering individual cultural producers and consumers during the 1970s and 80s to engage in home taping and the DIY movement. Such instances of grassroots creativity and distribution posed significant threats to the mainstream recording industries: using cassette tapes, amateur producers were able to bypass established labels; and given the ease of copying, consumers could readily infringe music copyright (an aphorism at the time was 'home-taping is killing music'). These historical connotations are playfully resurrected in

h-pop artists' knowing aesthetic references: in the crude punch-record mashups of *Edward Flex Presents*: *Do You Believe in Hawaii?;* in the xeroxed image of Whitney Houston on the cover of Oneohtrix Point Never's *Betrayed in the Octagon*; and in the lo-fi aesthetic of Ducktails' *Ducktails II*.[40] In the fiercely limited distribution these titles and others enjoy, h-pop artists exploit, render audible and ambiguously ironise the cultural 'authenticity' that cassette tape has accrued through its associations with DIY and home-taping.

Tactics like these helped to spearhead the cassette tape 'revival' in indie popular music from the late 2000s. But despite the cassette's prominence in the h-pop material-aesthetic imaginary, more common as release formats for the genre have been vinyl, CD-R and digital formats like FLAC. Thus, in the signature releases of James Ferraro, one of h-pop's foremost artists, cheap cassette boomboxes and old samplers are used to achieve a lo-fi, collage-like tape sound which is then immediately remediated by CD-R or FLAC. A similar remediation is also central to Oneohtrix Point Never's influential track 'Nobody Here' from 2009. The track consists sonically of a looping one-bar sample from Chris de Burgh's 1987 song 'The Lady in Red', as mentioned before, slowed down in pitch by a whole tone and subjected to dense reverberation and echo. More significantly for this discussion, the track was immediately remediated by a YouTube audiovisual version involving a heavily compressed video of a looped, never-ending kaleidoscopic rainbow road drawn from a 1983 laser-disc game commercial.[41] Although originally released as part of the *Memory Vague* collection, a limited-run DVD-R of remixed commercials and music videos released on Root Strata, it was through its circulation on YouTube that 'Nobody Here' gained notoriety.[42]

YouTube offered much more than a distribution platform for 'Nobody Here', however, for the highly developed vernacular cultural practices engendered by YouTube and the internet by the late 2000s provided a shared horizon of expectation on which the video purposefully draws and which it also subverts. This is manifest first in the way the video plays with anonymity. Only the title, date and cryptic username of the uploader, 'sunsetcorp', accompany 'Nobody Here'.[43] Identifying the author behind the pseudonym invites the user to google 'sunsetcorp', which leads to a YouTube track by the artist Dania Shapes; this encourages the user to google 'Dania Shapes', which leads to Dan Lopatin; and this further draws the user to google 'Dan Lopatin', if s/he is not already aware that Lopatin is the musician behind Oneohtrix Point Never. While it could be argued that such YouTube-generated, web-tracking practices are

peripheral to the aesthetic experience afforded by 'Nobody Here', its presentation on YouTube seems engineered to take the user on a journey playing with notions of concealment and revelation that have come to be associated with the internet (Baym 2015; Turkle 1999, 2005). Surfing the web is, then, an aesthetic feature of the YouTube version of 'Nobody Here': we are meant to encounter the track serendipitously, to be puzzled as to its origin and meaning, and to turn to Google for answers. Through its remediation by YouTube, an extended experience of the track is proffered, one that plays ironically with 'Web 2.0' notions of participation, virtuality and cyberspace, engendering a type of 'Web 2.0 aesthetics'.

A second way in which the video draws on the particular culture of internet use associated by 2009 with YouTube is through the mix of references it assembles. When 'Nobody Here' debuted, YouTube had already established itself as a portal to the pop cultural 'past'. But YouTube as an archive is far from being a universal storeroom of culture. It is dominated by the tastes of its largest demographic, which is white 25–34-year-olds based in the USA.[44] As such, material of the 1980s and 90s when the millennial generation were children is disproportionately well represented. In the track's references to 80s 'bad' popular music, consumer culture and the technological sublime, 90s culture jamming and ironic new age mysticism, it was as though 'YouTube' as a cultural phenomenon was itself being consumed and regurgitated – and indeed, all of the cultural material on the *Memory Vague* collection is sourced from YouTube. The 'Nobody Here' video's signal hypnotic loop, somewhere between a startup screen for a computer game and a psychedelic trance video, therefore played directly with the shared memories and expectations of the burgeoning YouTube generation – a point attested to by user comments on the same page. In these comments, users develop obscure and poetic interpretations that riff on their tacit understanding of the track's cultural codes. One commentator writes, for example, of 'doing time trials on Rainbow Road', a reference to the 90s Super Nintendo game Super Mario Kart, adding spacily: 'I'm an actor trapped in a [sic] infinitely obscure 1980s hardware store promotional video. Eternity is a boring, beige universe of moustaches and mullets, powerdrills and plumbing supplies. The coil of the VHS around which my soul is wound is in perpetual rotation and the sound of the warped muzak emanating from the promotional stand echoes down the aisles of the store, in the perpetual night and mediocrity.'[45]

H-pop therefore combines online, YouTube-based intertextual references to offline, 80s and 90s consumer and pop cultures with playful and aestheticised intermedial crossings between analogue and

digital media – between cassette tape, DVD-R, FLAC and YouTube. The aesthetic experience proffered by h-pop is inherently a distributed one entailing ironic juxtapositions of media that play archly with the relations between them, while also mining each medium for its cultural and historical associations. Certainly, analogue media are digitally remediated – aspects of the aesthetics of cassette tape translated into FLAC or YouTube audiovisuality. But in a context in which no medium is transcended or recedes into disuse, and in which it is the cultural-historical and aesthetic connotations attached to specific media as well as their paradoxical juxtaposition that are to the fore, remediation is better conceived of as a pervasive intertextuality *of media* – that is, of *intermedial intertextuality*.

In vaporwave such intermedial intertextualities are equally striking. If the earlier genres embraced internet-specific practices that were coeval with the genre's emergence – microsound and email lists, hauntology and blogging, h-pop and YouTube – then vaporwave's aesthetics are bound up with the historicity and evolving materiality of the internet itself (Galloway 2012, 17). Earlier we described how the vaporwave subculture works intertextually, its albums made from recycled sounds and images found online, and intermedially, the audio tracks accompanied by bizarre visual and multimedia collages based similarly on material sourced online. In vaporwave these practices are both apparently more restricted than the previous genres, and vastly expanded: on the one hand, they are situated entirely within the genre's vibrant online life; on the other hand, they are engaged in not only by core artists but by the entire subculture. As a result vaporwave is a self-conscious and parodic intermedial assemblage: one in which sound, image, video and text carried by an array of platforms – Tumblr, Twitter, SoundCloud, Reddit – vie for attention in both their singularity and mutuality, and in which the uses made of each platform are reflexively attuned to its specific aesthetic and rhetorical conventions. The aesthetics of vaporwave are therefore bound up with an acute awareness of the ways in which the net multiplies music's mediations – sound, image, discourse, sociality – and the genre is constituted by experimentation both with the affordances of each platform and with their haphazard conjunction.

Indeed, vaporwave's uniformity on the IC map (Figure 9.7) signals a profound shift in the material mediation of music genres online: from blogging to Tumblr-based 'microblogging'. For it is Tumblr as a platform that is at the heart of vaporwave, and Tumblr's affordances engender a set of cultural practices that contrast markedly with those afforded by Blogger, the platform central to hauntology. Known for its minimal,

cryptic design, Tumblr is especially adapted for the uploading and manipulation of multimedia content – images, GIFs and short videos – rather than discursive text (as with Blogger). It affords quick and easy content updates and allows personalisation of individual web pages, in contrast with corporate-monopoly platforms like Facebook with their enforcement of a uniform site design. Vaporwave participants have created a very singular culture of Tumblr use: a garish collage-based aesthetic comprised of recycled digital images and clips, the visual detritus of the commercial online world (Figure 9.6). Indeed, the genre participates in a broader 'Tumblr aesthetic' that has become fashionable in recent years among underground digital music scenes (Valiquet 2014, 197). In vaporwave this is apparent in a shared absorption in the particular way that Tumblr as a platform mediates what is uploaded there, along with a reflexive intensification of this very material mediation. The dense interconnections in the IC vaporwave map indicate a frenetic, almost obsessive play with the material and aesthetic affordances of Tumblr, fuelling their creation of a radically involuted online genre world through honing and reproducing the vaporwave aesthetic. The effect of the rapid circulation of memes, through mimesis and appropriation, is purposefully to unbalance the economy of repetition and difference negotiated by all genres in favour of repetition. With its stylisation of 'participation' and 'community', and its reduction of genre to memes and stasis, the subculture exhibits a characteristic reflexivity about the life of the genre *as a genre*.

Yet if Tumblr became vaporwave's preferred medium, the genre's aesthetic, communicative and social practices are nonetheless distributed across a number of online platforms – apparent in its distinctive manifestations on SoundCloud and Twitter. Indeed, vaporwave manifests differently on each platform, mining its specific aesthetic and communicative affordances, just as each platform augments the assemblage that is vaporwave. SoundCloud was a key platform associated with the development of the 'hashtag genres' of the early 2010s.[46] Anonymous actors made use of SoundCloud's tagging feature to invent implausible genres, uploading slowed-down and subtly reworked recordings of existing genres with absurd new category names attached using the 'tag' feature, the most well-known being slimepunk, witchhouse, seapunk and vaporwave itself. Those engaging with SoundCloud generally foreground their relationship to the musical life of these genres, uploading tracks, DJ mixes or spoofs under the given hashtag. However, the hashtag genres also made significant use of images in the form of 'album art' attached to tracks, developing distinctive visual aesthetics to

accompany the sounds. For witchhouse, black metal imagery was mixed with deep house; for seapunk, computer-generated aqua imagery and occult symbolism; and for vaporwave, as described earlier, surreal visual collages combining 90s computer graphics, Japanese cityscapes, Roman busts and so on. In vaporwave, the SoundCloud practices parallel the characteristic uses of Tumblr, in which the visual aesthetic is more fully developed, while SoundCloud clips and playlists can in turn be embedded in Tumblr to create artist or fan webpages. Central to the vernacular creativity of the vaporwave subculture, then, is the experience of crossing between Tumblr and SoundCloud, utilising the affordances of both platforms.

The contributions of Twitter to this ecology are equally platform-specific. Although some vaporwave Twitter users post links to rich media sites like YouTube, the majority employ Twitter to post pictures or minimal texts that play in some way on the visual codes associated with the genre. Two things are notable about Twitter's emphasis on image and text, and how the platform mediates vaporwave as a genre. First, the sheer scale and energetic speed of posting on Twitter has given rise to very rapid, meme-like mutations of vaporwave's rigid visual codes. Images or text associated with the hashtag '#vaporwave' tend to be uploaded to the platform every few minutes; they range from live action photography conjuring up the vaporwave aesthetic, to computer-generated imagery created by amateur artists, to algorithmically chosen files posted by a Twitter bot ('the vaporwave bot'). Second, Twitter's huge user base (328 million) suggests that when the '#vaporwave' hashtag took off, it enabled vaporwave's migration far beyond the core subculture, accelerating the genre's meme-like spread and igniting new Twitter-specific forms of participation largely divorced from the experience of musical sound. Those participating in this Twitter-based activity will have come to know vaporwave and its growing notoriety through its popularisation by articles on online music sites like Pitchfork and The Quietus. Twitter thus meshes with and exacerbates key features of the vaporwave aesthetic: with the hashtag '#vaporwave' acting as a meme like any other, Twitter compounds the genre's already memetic nature. At the same time, Twitter amplifies the genre's aesthetics of participation, its 'web 2.0 aesthetic'. If, in vaporwave, these dual aesthetic qualities – mimesis, participation – carry reflexive and parodic undertones, on Twitter they may be evanescent or absent. On Twitter, '#vaporwave' is unleashed as one of any number of ambiguous signifiers circulating online – with no necessary relation to musical sound.

Subtler and diachronic forms of intermedial intertextuality are evident in the ways in which the vaporwave subculture reflexively returns to a more stripped-down, 'content agnostic' style of internet use – one that, by the 2010s, had been superseded by content-specific rich media platforms. Consider the case of the FTP architecture that, as mentioned earlier, supported microsound's 'project page' distributed compositional practices in the late 90s. By the time of vaporwave's emergence, a cloud-based version of the same architecture had become widely available through the commercial services MediaFire, Megaupload and RapidShare. Music was at the centre of a series of controversies that erupted around these platforms, as musicians, labels and in due course the US government criticised how their use was encouraging online black markets in copyrighted music.[47] It is against this background that vaporwave's use of MediaFire as a distribution platform can be understood: for the reference to the platform is arch and reflexive, implicitly condoning 'piracy' as the norm for online consumption – and indeed, vaporwave artists like Mediafired™ are notorious for sharing whole albums through these platforms. In keeping with the link between vaporwave and accelerationist politics, the subculture's embrace of MediaFire indicates enthusiasm for online 'piracy', evident in a deliberately ironic participation in accelerating the demise of the 'old' music industry. Attesting to this political undercurrent is the absence of even the smallest of labels or distributors from the IC vaporwave map (Figure 9.7), suggesting that vaporwave circulates largely through non-monetised online networks. This 'return' by the vaporwave subculture to the cheapest and most overcrowded online platforms for the storage and exchange of music is, then, an act of ironic reclamation: MediaFire and Megaupload are referenced, revived and *détourned* by vaporwave. More than remediation, such platforms are subject to intermedial intertextuality through practices that both mine and parody their earlier existence.

Conclusions

There is a tendency in recent media theory to treat the internet as 'a single object' (Streeter 2016, 184) or thing – a 'communication infrastructure', perhaps, which, thing-like, shapes practice, embodies standards, and becomes visible upon breakdown (Star and Bowker 2006). In this chapter we avoid such reifications; our IC-informed ethnography of the internet-through-music portrays instead a messier, multidimensional space of platforms and practices – a multiplicity composed of mediations,

themselves in motion. Similarly, the results of hybridising IC with other ethnographic and historical data amount to a riposte to the essentialism of some digital media studies (Manovich 2001; Murray 2017) as well as to approaches that extract one 'analytical unit' – the website, say – as the key to internet research (Brügger 2007). In our ethnographic analysis of the five genres we have continually had to draw out the sometimes unexpected nature of, and connections between, the material, discursive and social mediations characterising music's internet-mediated lives. Equally, we have had to acknowledge the local, national and transnational musical, cultural and material histories and imaginaries that enter into the practices we have described. It is as though the reduction of the internet to a thing, even an environment, is a way of trying to contain the ramifying complexity both of what our creative actors face – musicians, fans, critics, labels – and of what we now face as analysts.

In this conclusion we extend further two facets of the analysis presented in this chapter: questions of the aesthetic, and of time and history. In deciphering the aesthetics of the five genres, we have had recourse to concepts of intertextuality and intermediality. We want to consider these concepts in relation to alternative formulations. The most prominent related concept in new media theory is convergence: here digital media are portrayed in terms of a convergence of old and new media, fostering a 'flow of content across multiple media platforms' (Jenkins 2006, 2).[48] This perspective finds its grounding in 'the technical ability [to translate] words, graphics, text, sound, speech, and images … into uniform electronic bits of binary code' (Elsaesser 2013, 16) or, in Kittler's terms, how via optical fibre cables 'the formerly distinct media of television, radio, telephone, and mail converge, standardised by transmission frequencies and bit format' (Kittler 1999, 1). In contrast, we have been concerned not with 'content', uniform bits or technical standardisation but the opposite: how the singularity of diverse media, formats and platforms enlivens affectively-imbued practices that exploit their very different material-aesthetic potentials, invariably with reference to musical, media and cultural histories. We have shown how vaporwave's subcultural practices manifest differently in Tumblr, SoundCloud, Twitter and MediaFire, and how vaporwave aesthetics can be grasped only through the juxtaposition of such platform-specific practices. As a concept, convergence overemphasises integration: if 'the histories of [commercial] media convergence … trace an arc towards an increasingly "organic", unified and coherent experience' (Cubitt 1998, 139), this should not be mistaken for the 'natural order' or actuality of cultural practices online.

A contrasting approach comes from the musicologist Nicholas Cook's work on musical multimedia, where he criticises any reduction of the relation between musical sound, text and visuality in opera, film or music video to one of identity. Instead, he avers, meaning 'does not inhere in one medium or another … [Rather,] it is the *interaction* of different media that defines multimedia' (Cook 1998, viii). In his productive commitment to analysing differences and relations between media, Cook heralds recent approaches to the 'new audiovisual aesthetics' (Richardson et al. 2013). Despite his apparent interest in materiality, however, Cook's framing remains a semantic one focused primarily on meaning. Moreover, while he acknowledges the distributed authorship of multimedia works, Cook presumes a unifying artistic vision overseeing what is presumably a unified work.[49] These are precepts that the internet-mediated genres analysed in this chapter put radically to the test.

A similar relational approach is offered by the concept of polymedia, arising from ethnographies of everyday uses of communication media like the smartphone, instant messaging and Skype. Polymedia offers an 'ecological' approach to media consumption, a shift 'from a focus on the qualities of each particular medium as a discrete technology, to an understanding of new media as an environment of affordances' (Madianou and Miller 2011, 170). The complementary affordances of Tumblr, SoundCloud and Twitter as they combine in the vaporwave assemblage might partly be understood in these terms. Yet the stress on the functionality of media for interpersonal communication is less relevant for our material, lacking recognition both of the aesthetic motivations and effects entailed in moving across media, and of the reflexive engagement with media genealogies that are so central to the five genres.

In attempting to capture the materialist aesthetics of the five genres, we have shown that it is essential to analyse aesthetic experience as it is distributed across different media, formats and platforms in both their singularity and their contingent interrelations. To grasp this, rather than multimedia or polymedia, we have turned to concepts of intertextuality and intermediality. If intertextuality is well established as an analytical concept,[50] intermediality and our novel hybrid, intermedial intertextuality, are less so.[51] In employing the concept of intermediality we intentionally invoke both its art-historical genealogy and recent media-theoretical uses. The concept is traced back to the creation by the groups Fluxus and Group Ongaku of 'happenings that fell between media' (Salter 2010, 199), participatory performances incorporating sculpture, poetry, music-making and 'social games' in which the line between artists, musicians and

spectators was purposefully blurred.[52] More recent discussions of intermediality stem from a growing interest in the utility of the concept for art, literary and media studies. It is taken to refer to 'relations between media, to medial interactions and interferences', which in turn presumes the prior existence of 'distinguishable entities between which there could be some kind of interference, interaction or interplay' (Rajewsky 2010, 51–2), posing the challenge of defining the identities and borders of distinct media (Arvidson 2012; Elleström 2010). It is perhaps unsurprising that intermediality is identified as an increasingly urgent perspective to bring to digital culture (Fornäs 2008), one that 'stresses plurality and interrelations rather than monolithic and essentialist reductions' (Fornäs 2002, 89). In parallel, music research in digital conditions has embraced such intermedial notions as 'music in the expanded field',[53] indexing how composers today may encompass a host of art and media forms within their compositional practice (Ciciliani 2017, 1).

For the purposes of analysing the five internet-mediated genres in this chapter, while intertextuality is clearly relevant, as indicated earlier, we propose that intermediality is particularly salient, and in the following ways. First, in expanding the analytical lens unequivocally beyond text – language, discourse – to media. Second, in addressing the increasing complexity of relations between media, formats and platforms, especially in genres like those we have analysed in which it is the relations between media, formats and platforms that are precisely at stake. It is only on this basis that we can ask: what *are* the relations between the media, formats and platforms at issue – juxtaposition, contiguity, contradiction, integration? And what intermedial aesthetic effects are thereby produced? Third, in moving beyond questions of 'meaning' or 'communication' and highlighting instead the material-aesthetic dimensions of intermedial experience. Fourth, in relation to authorship, in making it possible to break with any assumption of the sovereign author-subject and the hard-wired division of labour between producer and consumer that tends to underpin discussions of multimedia and some intermedial art. Instead, we advocate abandoning the solace provided by notions of unified authorship and unified artistic vision, and asking instead: what is the nature of authorship – collective or individual, dispersed or integrated, uncoordinated or coordinated? And does the artist-spectator, musician-fan or artist-label division of labour remain intact, and if not, precisely how is it changing? The genealogy of intermediality seems fruitful in this regard given the ways in which Fluxus performances challenged the division of labour between artist and spectator – just as vaporwave thrives on the frenetic amateur productions of its fan subculture. And fifth and

following on, intermediality must be allied, we contend, to questioning any assumption of the unity of the 'work'. Instead, one benefit of the concept of assemblage as we have applied it in this chapter is that it, too, foregoes any presumption of organic unities or totalities in favour of the existence of nonlinear relations between components – a stance that can fruitfully be taken to the aesthetic, as when we wrote earlier of the vaporwave assemblage as a distributed entity in which online sounds, discourses, visualities and socialities vie, collide and diverge to produce intermedial aesthetic effects (pp. 397–402).[54]

It is on the basis of this reasoning that we coined the term intermedial intertextuality, posing it against remediation. We did this when discussing the ways in which the h-pop assemblage entails paradoxical and ironic juxtapositions and translations of media – cassette tape translated into FLAC and YouTube; while vaporwave revivifies and parodies 'old' internet platforms like MediaFire and Megaupload not only for their functionality but in a subversive identification with their anticommercial, pirate political histories. In both genres specific media – cassette tape, MediaFire, Megaupload – are invoked for their genealogies and their cultural-historical connotations, their past and current usages entering into generative and recursive interconnections (cf. Winthrop-Young 2015). This enacts, we suggested, an increasingly pervasive intertextuality of media – hence, intermedial intertextuality.

Writing of the genealogies and cultural-historical connotations of media signals our final theme: time and history. In addressing music's mediation by the internet we have also drawn attention to the historicity of, and the temporalities produced by, the five genres, as well as the historicity of internet technologies and of their changing cultures of use. Our analysis identifies three critically important dimensions of temporality. First, how the identities of the genres can only be grasped relationally by tracing their temporal interrelations, as the nostalgia genres react against the modernist sounds and technological imaginaries of microsound and similar genres, and as the transient identity of h-pop bifurcates into the mainstream chillwave and underground vaporwave. Second, in the aspiration among microsound actors – musicians, critics, labels – to effect a historical transition, a pop-art crossover, enacted through web-based genealogies and hyperlinking. And third, in the reflexive way that time is itself figured materially and symbolically in the genres' sonic, visual, material and discursive mediations as core elements of the aesthetic – in microsound's microtemporal modelling of timbre, and in the nostalgia genres' fetishistic absorption in obsolete sound media and cultural icons. In the context of the relentless churn of internet

technologies, we traced the coevolution of the five genres and the particular cultures of internet use associated with them, pointing to a growing reflexivity towards the internet's history and aesthetic propensities among musicians, fans and critics. If the identities of the nostalgia genres have been taken by commentators to be a response to an internet-based cultural archive (Fisher 2013; Reynolds 2011; Roy 2014) or 'digital afterlife' (Wright 2014), then vaporwave – given its reflexive and parodic engagement with earlier internet practices, platforms and interface aesthetics – plunders the historicity of the internet itself, now rendered a historical medium or cultural form like any other. All five genres therefore evidence intensely reflexive engagements with concepts of historical time – 'concepts that form part of the calculative agency of [musicians and] artists and that supervise the creation of any cultural object' (Born 2010b, 196).

Seeking theoretical resources, we want to hold these observations about the figuring of time and history up against recent media theories: media archaeology and cultural techniques. While it is impossible to address these burgeoning paradigms here in more than broad strokes, it is notable how they embody the tendency, more widespread in media theory and social theory, to embark from the question of technology, medium, object or device and to espouse, more and less subtly, variant technological determinations, yielding accounts of history in which technology is figured as the primary driver of historical change. In Bernhard Siegert's words, cultural techniques 'such as counting or writing always presuppose technical objects capable of performing – and to a considerable extent, determining – these operations' (Siegert 2013, 58). Standing behind both traditions is the figure of Friedrich Kittler, with his replacement of 'Foucault's "historical a priori" with a "technological-medial a priori" according to which "social, cultural and epistemological structures presuppose technological conditions of mediation"' (Winthrop-Young 2006, 97, citing Spreen 1998, 7). And in Niklas Luhmann's posthuman theory of communication, often discussed alongside Kittler, any humanist leaning is eclipsed by the autopoeisis of machinic communication – by the prospect of computers creating 'a fully independent structural coupling between a reality they can construct and psychic or communicative systems' (Luhmann 1997, 117–18). The method that results focuses via core media and communication technologies 'on short-, middle- and long-term structuration processes that have taken place throughout history on various sub- and supra-human levels' (Winthrop-Young 2006, 94). Occupying the problem-space between mediality and technics, such approaches repeat the structuralist

tendency towards stability and closure, ignoring the need when theorising history to address what Derrida called 'ruptures' or 'events' (Derrida 1978, 351).

Media archaeology, while mediacentric, is however a plural paradigm encompassing a diversity of approaches to 'the crucial relation between history and theory', allied to 'a rethinking of temporalities' (Strauven 2013, 67–8). According to Wanda Strauven, one strand of media archaeology, the New Film History, made significant contributions from the late 1970s by 'challenging … the methods of traditional historiography such as chronology, genealogy, and especially teleology' (2013, 63). Against such methods, media archaeology advocates a Foucauldian historical method attentive to discontinuities, singularities, contingency and multiple origins, alongside the recovery of 'dead', forgotten and imaginary media. Another strand of media archaeology is embodied in the practice of artists – among them Paul DeMarinis, Perry Hoberman, Catherine Richards, Jill Scott, and from an earlier generation Jeffrey Shaw and Nam June Paik – who engage with the technological past via the anachronistic revivification and hybridisation of mechanical, analogue and digital media (Strauven 2013). Media archaeology therefore encompasses both theoretical work and media art practices. There are obvious resonances here with the theory-informed practices of microsound, h-pop and vaporwave musicians, who, in this light, might be seen to be 'doing' media archaeology. But of greater significance for our purposes is the irony whereby in its rethinking of historical method, media archaeology as a body of theory does not take sufficiently into account the reflexive, culturally and historically situated nature of the work of the media artists who embody one strand of media archaeology as a field. For if it did, it would have to acknowledge reflexive human engagements – cultural, artistic and intellectual – with media histories and genealogies as a key component of its model of media-historical process. It is just this taking into account that has been demanded by the material we present in this chapter. How symptomatic of a post-humanist a priori, then, that the significance of the reflexive media art practices that participate in media archaeology does *not* find its way into media archaeology's own theorisation of history!

The paradigm of cultural techniques might seem to offer a more propitious model of history, inasmuch as it recognises 'culture' as a component of historical process. But this is a restricted and post-human, 'technologically-oriented' concept of culture defined by opposition to the 'Goethean' understanding of culture as *Bildung* that haunts German cultural studies (Siegert 2013, 57–8). In Cornelia Vismann's exposition,

'the theory of cultural techniques is … a theory of medium-based operations'. That is, 'cultural techniques describe what media do, what they produce, and what kinds of actions they prompt. If media theory were, or had, a grammar, that agency would find its expression in objects claiming the grammatical subject position and cultural techniques standing in for verbs'. In sum, 'tools prescribe their own usage' (2013, 88, 83). Culture is equated here with those many 'medium-based operations' that inscribe a boundary between nature and culture (2013, 89). Cultural techniques therefore declares itself an empirical enterprise concerned with the 'ontic' as opposed to the ontological (Siegert 2013, 57); yet the accounts that it provides of the 'usage' or practices 'prescribed' by media are resolutely normative and grammatical.

Two observations follow. On the one hand, by dwelling on the existence of norms of 'usage', cultural techniques certainly steps beyond the looser notion of technological affordances. On the other hand, when we engage in ethnographies of the uses of technologies – as in the internet-based practices described in this chapter – as or more striking are the many experimental and inventive uses that extend or escape such prescribed grammars: an FTP server employed for collaborative composition in microsound; Tumblr and MediaFire used for intermedial practices in vaporwave. Rather than rule-bound grammars of practice, or 'cultural techniques', these realities are better analysed with reference to Madeleine Akrich's identification of the distance between the uses 'scripted' into a technology and the variant uses that actually ensue – as well as the politics thrown up at this juncture (Akrich 1992). Indeed it is hard not to see Akrich's (1992, 211) 'technically designated prescriptions' as a precursor to Vismann's 'tools prescribe their own usage'. Akrich puts it unequivocally: 'If we are interested in technical objects … we have to go back and forth continually … between the designer's projected user and the real user, between the world inscribed in the object and the world described by its displacement.' It is this 'incessant variation', she contends, that gives rise to the 'crucial relationships' in the historical cases she relates (1992, 208–9). That cultural techniques sees itself as allied to actor-network theory is, then, ironic, since the properties of ANT's actors, media technologies included, are predicated on their relational identities within networks of mutual mediation; while the normative power ascribed to cultural techniques is at odds with Akrich's and ANT's insistence on the *variable* capacities of technologies to stabilise and naturalise their 'scripts' (Akrich 1992, 219).

What is striking is the cost of the post-human, technology- or medium-centred optic as it delimits the kind of history that can be written.

For these theories could not address the rich, reflexive and recursive relationships to media, formats and platforms exhibited by the actors at the epicentre of our ethnography, nor the ways in which it is the specific musical, political, social- and cultural-historical associations attached to the media, formats and platforms at issue that influence their historical return. To spell it out: it is not because of some a priori commitment to humanism that we extol the importance of taking into account the reflexive human relations to media and media histories evident in the ethnography in this chapter. Rather, it is because taking them into account makes for a better materialist theorisation of history – one that acknowledges how media are invariably encountered imbued with cultural, musical, political and social histories and imaginaries. This returns, again, to the enhanced account of remediation offered by the concept of intermedial intertextuality.

As an alternative to the limits of media archaeology and cultural techniques we would counterpose accounts from art history that, no doubt leaning too far towards a subject-centred humanism, attend to the specificity of the cultural and material histories within which particular media are encountered and acquire their 'webs of significance' (Geertz 1973), thereby entering into and stimulating renewed, reflexive cultural practices. A good example are Rosalind Krauss' analyses, influenced by the writings of the conceptual artist Jeff Wall, of how photography and portable video entered into and catalysed the emergent conditions that generated conceptual art and what she calls the 'post-medium condition' (Krauss 1999, 2000; Wall 1995). Krauss details how both media were encountered by artists from the 1960s as 'theoretical objects' mediated by the writings of Benjamin, Barthes, Baudrillard and others, in a milieu in which the reigning critical paradigm centred on aesthetic autonomy and the specificity of the medium, enunciated by Clement Greenberg and Michael Fried, was in flux. Video arrived in the wake of a scene – a group of artists, composers and filmmakers including Richard Serra, Robert Smithson, Carl Andre and Michael Snow – that had been collectively engaging with both modernist and early film through regular screenings held in the late 60s and early 70s under the banner Anthology Film Archives in a room in SoHo, New York City. Anthology was caught up in the idea emerging in structuralist film of film as an 'apparatus' composed of celluloid strip, camera, projector, projected beam of light, screen and the audience itself 'caught between the source of the light behind it and the image projected before its eyes' (Krauss 2000, 24–7). When Portapak video encountered this situation, the effect 'was to shatter the modernist

dream' through its essence-less, 'constitutive heterogeneity', its closeness to television as a broadcast medium, one 'that splinters spatial continuity into remote sites of transmission and reception'. By existing in 'endlessly diverse forms, spaces, and temporalities', television and video thus denied any 'formal unity [to] the whole' (Krauss 2000, 30–31). Out of this trajectory, video entered Serra's work via the mediation of the experience of the 'aggregative' medium drawn from the 'apparatus' of structuralist film, yielding in turn his emulation of television in a number of works of the 70s. All of this participated in the demise of 'medium-specificity', auguring a vast expansion of what passed as artistic media, including not only photo-conceptualism and video art but land art and installation art. Video was encountered, then, generatively and imaginatively within a fluid set of conceptual and aesthetic currents – what Krauss calls an emergent 'post-medium condition'. It is not that video arrived as a prime mover, prescribing its grammar of practice and triggering normative 'usages'. It is, rather, that conceptual, cultural and social conditions were already being primed for shifts beyond the 'reductivist modernism' of Greenberg and Fried (2000, 27), and that video, again, entered into and catalysed these gathering aesthetic, conceptual and intellectual insurgencies and waves, which themselves mediated, while also being mediated by, video as a medium.

It is to be hoped that treatments as nuanced as these, responsive to cultural and intellectual as well as material histories and conditions, will spring up in digital media and specifically internet studies to replace the essentialist tendencies of the first phase of research. As a result, this chapter highlights the need to bring the historicity of and the temporalities produced by distinctive media into the theoretical and methodological armoury of the digital humanities (Born 2015, 380) – and to do so with reference to the copious cultural, political and social associations in which they are enmeshed. While the kernel of the chapter is an analysis of five remarkable internet-mediated music genres, the to and fro movement between hybrid ethnography and media theory indicates how ethnography 'throws up material and findings which cannot be incorporated into existing frameworks', acting as a 'subtle tool for the application and the amendment of theory'. The methodological implication is that media theory will benefit greatly from empirical research of this kind, within the ambit of a post-positivist empiricism (Born 2010b; chapter 1, pp. 12–13). Our wider ambition is to proffer a framework for further studies of internet-mediated music genres, as well as internet-based cultural practices writ large.

Notes

1 Our use of the term 'network' does not invoke the theoretical or methodological commitments either of actor-network theory (cf. Latour 2005) or of social network analysis (cf. Scott 2017).
2 For a full discussion of the Issue Crawler software, how we adapted it, and the methodological and conceptual issues arising, see Born and Haworth (2017, 2018).
3 Summarised by Manovich thus: '*the visual culture of a computer age is cinematographic in its appearance, digital on the level of its material, and computational … in its logic*' (Manovich 2001: 180, italics in original).
4 The concept of 'natively digital' is used in digital methods research to refer to those media forms made possible by digitisation and the internet (e.g., tag clouds, ranking algorithms, hyperlinks): see Rogers (2013, 15).
5 This distinction between reciprocal hyperlinks that actualise a mutuality in social relations and aspirational hyperlinks that project relations with another entity, attempting to bring them into being, but in which there is no certainty that this will be achieved, is a rejoinder to notions of performativity which assume that by performing or enacting social relations they come into being (cf. Law 2004, 56; Latour 2005, 34–5).
6 See the 1999 Prix Ars Electronica jury's criticisms of the generic 'shuttling, tumbling, shingling sound of GRM Shuffler VST mode' in some electroacoustic art music (Eshun 1999).
7 The distinctive sound of microsound can be heard in the following tracks: https://www.youtube.com/watch?v=GNkS2l1oY20&list=PLiI5mVDXItD_T_cTJDev7n7CV62Wl4Zci&index=8, https://youtu.be/70byQuA58fg, https://www.youtube.com/watch?v=CUR7mFmoQsU. Accessed 31 January 2022.
8 For fuller technical analysis of the hyperlinks that produce the aspirational crossover effect, see Born and Haworth (2017: 621–2).
9 Notably, Whitman was commissioned to produce an 80-channel *musique concrète* work entitled *Rythmes Naturels* in the INA-GRM studios in October 2011, utilising early electronic instruments held in the archive.
10 Coined by Derrida as a pun on 'ontology' (Derrida 1994, 10), 'hauntology' has a specific meaning in the philosophy of history. It describes a 'spectral' agency that acts in and on the present from beyond. For Derrida, it was Marxism after the fall of communism in 1989 that raised the figure of the spectre. Neither alive nor dead, present nor absent, the left nevertheless feels a responsibility to Marxism – to preserve it. In his 2005 article, Fisher kept Derrida's concept more or less intact.
11 The term isolationism arose in the mid-90s as a term for a doomy, dissonant type of ambient music; it was the title of a 1994 compilation ambient album released by Virgin Records. See Reynolds (2006).
12 The BBC Radiophonic Workshop was itself a key point of convergence between electronic art music and popular television and its soundtracks, through the work of such composers as Delia Derbyshire, Daphne Oram and Maddalena Fagandini (Niebur 2010). Signature hauntology tracks include: https://www.youtube.com/watch?v=yGW05V7nCOQ&list=PLyeitmL4jzs15Gb4fXMXZFcOlx3K38uZt; https://www.youtube.com/watch?v=F7bKe_Zgk4o; https://www.youtube.com/watch?v=iH3fSojSk2w. Accessed 31 January 2022.
13 *The Wire* is a British-based experimental music magazine; all four of the prominent critics mentioned in this chapter have written for it regularly. It is nonetheless viewed ambivalently by many experimental musicians.
14 The tracks come from Oneohtrix Point Never, *Memory Vague*, Root Strata (RS43), 2009; James Ferraro, *Marble Surf,* New Age Tapes, 2008; Grouper, *A I A: Dream Loss,* Yellow Electric, 2011.
15 See http://www.alexa.com/topsites. Accessed 31 January 2022.
16 See https://www.youtube.com/watch?v=-RFunvF0mDw. Other signature h-pop tracks include: https://www.youtube.com/watch?v=vWlRoC807nY; https://youtu.be/iEsBE5Jqvp4. Accessed 31 January 2022.
17 It was an article by Keenan in *The Wire* that identified h-pop's emergence as a genre (Keenan 2009).
18 IDM (intelligent dance music) is an American term for a style of EDM that developed out of techno and breakbeat in the mid 90s. IDM took musical directions too complex for the dance floor – for example, in the music of Autechre and Venetian Snares.

19 From its emergence, h-pop was scrutinised because of its similarity to hauntology (e.g., Reynolds 2009).

20 Symptomatically, of the five genres, h-pop is the only one that does not appear on Glenn McDonald's comprehensive 'Every Noise at Once' genre map (http://everynoise.com/engenremap.html). Accessed 31 January 2022.

21 Characteristic chillwave tracks can be found here: https://www.youtube.com/watch?v=3Pt0V6K7WpM https://www.youtube.com/watch?v=m6z2D-wEV3A&list=PL8IYGnne8c3mg7IkKrazTjvLZ8vwdmZ96&index=1 https://youtu.be/hyO7P6LE7nA. Accessed 31 January 2022.

22 For a cultural history of magnetic and cassette tape, see Bohlman and McMurray (2017), and on cassette tape revivals, Demers (2017). The renewed interest in cassette tape has also generated numerous features in mainstream media: see http://www.theguardian.com/music/2010/mar/29/audio-cassette-comeback; http://www.bbc.co.uk/news/business-22533522; http://www.esquire.com/entertainment/movies/a30459/the-return-of-the-cassette/; http://www.independent.co.uk/arts-entertainment/music/features/a-comeback-for-the-humble-cassette-9358916.html. Accessed 31 January 2022.

23 GIF (Graphics Interchange Format) is a simple format for producing short, silent animations. Released in 1987, it continues to exert an influence in internet subcultures, despite its low quality.

24 On the concept of 'Web 2.0' as it contrasts with 'Web 1.0', see O'Reilly (2009).

25 Further reinforcing the perceived link to h-pop is the citing of Daniel Lopatin of Oneohtrix Point Never's *Eccojams Vol. 1* as a precursor of vaporwave. The album (credited in this URL to Lopatin's pseudonym Chuck Person) is composed entirely of slowed down loops of recycled 80s hits: https://www.youtube.com/watch?v=unN7QvSWSTo. Accessed 31 January 2022.

26 On intertextuality, and the differences between parody and pastiche, see Dyer 2007, esp. ch. 1.

27 Vaporwave's audiovisual aesthetic can be gleaned from the following links: https://youtu.be/YXHCv77IOAE?list=PLDaU3IXq3NJU2K0Hn09kBOH3U6TSVkWfz; http://blankbanshee.Bandcamp.com/album/blank-banshee-0; https://youtu.be/ZS96BuiZDag. Accessed January 31 2022.

28 Key accelerationist texts include Land (2011), Mackay and Avanessian (2014) and Noys (2014).

29 By 2016 vaporwave was being associated with the far right via the emergence of 'fashwave' – essentially a meme that borrowed vaporwave's atavistic-cyberpunk aesthetic but incorporated it with elements of the theories of the Italian fascist, Julius Evola. The episode was part of a long history of subcultural infiltration by far-right groups: see Tuters (2021).

30 The favoured use of Tumblr among vaporwave artists and fans suggests a much younger demographic than for the other genres. Hence, at the time of vaporwave's ascendance, although Tumblr's user base was smaller than other social networking sites such as Facebook, Twitter and Pinterest, for the lucrative demographic of 16–25-year-olds it exceeded those sites. See Smith (2013); Adweek, 'Infographic: Who's Really Using Facebook, Twitter, Pinterest, Tumblr and Instagram in 2015' (2015): https://www.adweek.com/brand-marketing/new-social-stratosphere-who-using-facebooktwitter-pinterest-tumblr-and-instagram-2015-and-beyond-1622/. Accessed 31 January 2022.

31 Forced Exposure has a long and multifaceted history in US underground music. It operated, first, as an independent music zine edited by Jimmy Johnson and Byron Coley, founded in 1982; second, as a label specialising in free improv, psychedelia, drone and noise; and third, from 1993, as a mail order distributor.

32 Since this chapter was written, Editions Mego ceased operations due to the death of its founder, Peter Rehberg. Its sub-labels have, however, continued to operate.

33 The label website described their specialisms as '… underground, private press, psych, free jazz, avant-garde, experimental, folk, blues, sound poetry, punk, DIY, garage, you know what we're gettin' at'. https://web.archive.org/web/20081212175211/http://www.volcanictongue.co.uk/. Accessed 31 January 2022.

34 Volcanic Tongue Update, email, 30 May 2010.

35 For instance, the Touch Music 'about' page emphasises the label's 'mindful[ness] of quality both aesthetically and musically', and the high 'level of care and attention that has made it the most enduring of any independent company of its time': https://touch33.net/about. Accessed 31 January 2022.

36 For Whitehead, prehensions amount to a 'kind of generalised perceptive interrelation' between subjects and objects (Halewood 2011, 30); but since the process of becoming has priority in

Whitehead's ontology, 'the terms "object" and "subject" lose their usual sense – "subject and object are relative terms"' (Halewood 2011, 29, quoting Whitehead 1967, 176). When a subject prehends its objects, 'the "potentiality" immanent in the objects is "actualized" in the form of a cocreative becoming concrete (concrescence)' (Stenner 2011, 106).

37 Interview with Mark Fell and Tony Myatt by Georgina Born, 27 April 2012.

38 Whitman told *The Wire* magazine that the *Playthroughs* tracks were 'leaning on academia a little bit' (Mandl 2002).

39 Boomkat. 2002. *Playthroughs* review: https://boomkat.com/products/playthroughs-0910409c-0710-487d-a1a3-3aa639bbd954; Boomkat. 2002. *Swarm & Dither* review: https://boomkat.com/products/swarm-dither-b922b26b-12b5-48ff-8290-bba9757ad91f. Accessed 31 January 2022.

40 *Edward Flex Presents: Do You Believe in Hawaii?* https://www.youtube.com/watch?v=_cUb-W-7Dtk; Oneohtrix Point Never, *Betrayed in the Octagon* https://www.youtube.com/watch?v=CToGFehgNQk'; Ducktails, *Ducktails II* https://ducktails.bandcamp.com/album/ducktails-ii. Accessed 31 January 2022.

41 See https://www.youtube.com/watch?v=-RFunvF0mDw. Accessed 31 January 2022.

42 The original upload by 'sunsetcorp' had received 806,881 views at the time of writing; taking into account all the duplicate uploads, the total viewership is probably closer to one million: https://www.youtube.com/watch?v=-RFunvF0mDw. Accessed 31 January 2022.

43 This is striking given that the *Memory Vague* collection the track originally appeared on was unambiguously presented as a Oneohtrix Point Never release, so anonymity is reserved for the internet.

44 See https://digiday.com/media/demographics-youtube-5-charts/ http://images.jobcentral.com/jcv2/chad/YouTube-One-Sheet.pdf; http://info.globalyogi.me/blog/all-you-need-to-know-about-youtube-users-and-statistics. Accessed 31 January 2022.

45 See https://www.youtube.com/watch?v=-RFunvF0mDw. Accessed 31 January 2022.

46 Stereotropic, 'A Beginner's Guide to Hashtag Genres', https://stereotropic.wordpress.com/2012/03/15/a-beginners-guide-to-hashtag-genres/. Accessed 31 January 2022.

47 The US government accused Megaupload's founders of presiding over 'massive' online piracy, as well as racketeering and money laundering. Its operations were closed down in January 2012 (Williams 2012).

48 The convergence paradigm can actually be wider, addressing also economic, industrial and organisational convergence (see Cooke 2002; Elsaesser 2013).

49 Indeed, his concept of distributed authorship finds its source, paradoxically, in a romantic ideology of the unified author, 'the idea that the work reflects a particular conception of an individual personality' (Van Eechoud et al. 2010, 11).

50 See Plett (1991); Allen (2000). Dyer (2007) updates the theorisation of intertextuality, anatomising a huge array of related literary techniques, foremost among them pastiche.

51 On definitional issues around intermediality, see Elleström (2010), Fornäs (2002; 2008).

52 The term 'intermedia' is credited to Fluxus member Dick Higgins who, in a 1966 essay, linked it to Duchamp, Cage and Kaprow (Higgins 1966; 1997).

53 The allusion is to Rosalind Krauss' seminal essay, 'Sculpture in the Expanded Field' (1979).

54 It is productive to compare our idea of vaporwave as an assemblage or distributed entity with Osborne's concept of a 'distributive unity' when he discusses the ontology of the photographic image as 'the *mode of unity of the relational totality* of the … different photographic forms coexisting within the present: chemical photography, film, television, video and digital imaging', a 'totality' united by 'the photographic as a *cultural* form' (Osborne 2013, 118–9). Note the strong sense of organic unity in Osborne's formulation in marked contrast with ours.

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Discography (by genre)

microsound

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Taylor Deupree and Richard Chartier. 1999. *Spec*. 12k.
Kim Cascone. 2004. *Pulsar Studies*. Anechoic.
Curtis Roads. 2005. *Point Line Cloud*. Asphodel.

hauntology
Boards of Canada. 2002. *Geogaddi*. Warp Records.
Belbury Poly. 2004. *The Willows*. Ghost Box.
Broadcast. 2006. *The Future Crayon*. Warp Records.
The Caretaker. 2008. *Persistent Repetition Of Phrases*. Install.

hypnagogic pop
James Ferraro. 2008. *Multitopia*. New Age Tapes.
Monopoly Child Star Searchers/Angel Snake. 2008. *Monopoly Child Star Searchers/Angel Snake.* Pacific City.
Oneohtrix Point Never. 2009. *Memory Vague*. Root Strata.
Blues Runner. 2009. *Mind Surfers Installation 4/12/08*. Outer Limits Recordings.

chillwave
Washed Out. 2009. *Life of Leisure*. Mexican Summer.
Neon Indian. 2009. *Psychic Chasms*. Lefse Records.
Best Coast. 2010. *Crazy for You*. Mexican Summer.
Toro y Moi. 2011. *Underneath the Pine*. Carpark Records.

vaporwave
Chuck Person. 2010. *Eccojams Vol. 1*. The Curatorial Club.
Laserdisc Visions. 2011. *New Dreams Ltd*. Beer On The Rug.
Macintosh Plus. 2011. *Floral Shoppe*. Beer on the Rug.
INTERNET CLUB. 2012. *Redefining the Workplace*. Not On Label.

10

Postlude: musical-anthropological comparativism – across scales

Georgina Born

In the introduction to this book, I proposed that a relational musicology alerts us to how the digital music assemblages presented in the chapters 'demand to be analysed both in their singularity, as heterogeneous unities, and comparatively … in their complex co-existence and co-evolution' (Born 2010a, 222). In MusDig we put this into practice by working collaboratively before and after our fieldwork, setting up comparison both within and between our studies, probing the identities of the assemblages as they became evident relationally through 'differences of aesthetic and practice, of discursive, social and technological mediations' (Born 2010a, 222). What insights are produced by comparison, and what lines of connection does it conjure up between the ethnographies?

In this postlude I pursue these questions, moving conceptually across the ethnographies as though across a series of luminous gems with multiple facets, each refracting light differently, identifying singularities and commonalities, imitations and interferences – the metaphor returning us to mediation (facets) and assemblages (facet-enlivened gems). Each study is revealing and generative in itself, as we have seen. By juxtaposing them, additional, often unanticipated connections and differences come into view. In this way comparison redoubles the properties of the case – how it 'can incite an opening, an altered way of feeling things out, of falling out of line' (Berlant 2007, 666). It must be emphasised that the comparative operations played out in this postlude do not aspire to the status of conclusions or to have the final word. They do not subsume the chapters but sit alongside them, the whole forming a nonlinear narrative, as mentioned in the introduction. Whether the reader arrives at the

postlude after or before reading the chapters, this comparative discussion contributes an additional speculative dimension to our work.

The postlude contains three sections. The first pursues questions of the aesthetic as they arise in our studies, tracing the mutual mediation of the aesthetic and the social, time, ontology and materialities across the ethnographies. The second section shifts to issues of material and technological mediation, taking off initially in response to prevalent assumptions in scholarship on digital music technologies. The third and longest section builds on the previous two, pursuing matters of social mediation through various combinatorial arrangements of what I have elsewhere called four planes of social mediation of music – and proposing a fifth.

Across the three sections, the postlude sets out to demonstrate how it is the analytics of mediation – the deciphering of two-way relations and transformations between, say, aesthetic processes, on the one hand, and social, material and temporal processes, on the other – that productively *impurifies* the very category of the aesthetic when it comes into focus ethnographically. Indeed, it will become clear that this is precisely what anthropology adds: a capacity ethnographically to flesh out such impurifications in what may otherwise be taken analytically to be neatly demarcated categorical domains – the aesthetic, technological, social and so on. These impurities point to musical assemblages as anti-essential 'messes', manifestations of a 'real' that 'doesn't fit with the package deal of commonsense realism' (Law 2007, 11). Yet they also enhance our grasp of the plurality of causal, catalysing and synergistic forces and processes to be traced in understanding and explaining ethnographic situations.

On aesthetics and its mediation

A first comparative effect produced by the studies gathered in this book is to reconceptualise the aesthetic in relation to music – with particularly sustained discussions in chapters 6, 8 and 9. Sociological and science and technology studies (STS)-inflected scholarship on (digital) music technologies has tended to overlook the aesthetic (Pinch and Bijsterveld 2004; Prior 2018).[1] Media theorist Lisa Gitelman endorses such a stance: citing Alfred Gell's 'methodological philistinism' (Gell 1992, 42), she calls for a 'methodological detour around the aesthetic in order to make the multiple conditions of its cultic status … more clear'. Gitelman draws a firm line between studying the 'social and institutional contexts' that produce canons and studying the arts and media while 'believing' in their

aesthetic value (Gitelman 2006, 153–4). But must one 'believe' in existing formulations of the aesthetic or aesthetic value to bring the aesthetic within the ambit of social, cultural and media research? Recall the two imperatives behind theories of music's mediation: to foment an anti-essentialist analytical ontology of music, and to surpass the explanatory limits of notions of 'context'. An alternative approach to Gitelman's would reflexively register the difficulty of bracketing aesthetic judgments while being aware that explanation must take the cultural or media object and its aesthetic qualities into account.[2] In this vein, I have suggested, anthropological and sociological research on cultural production can enhance the arts through interdisciplinary dialogue 'by providing a richer repertoire of methodological and conceptual resources [than hitherto] to inform critical discourses' (Born 2010b, 28–9). It can do this by generating 'a critical field that is focally concerned with the social and material, the temporal and ontological, as these *mediate and imbue* the aesthetic' (Born 2010b, 28). Writing these passages I had in mind exactly the kinds of aesthetic experimentation charted in several chapters in this book, particularly chapters 8 and 9, and I observed that such criticism 'is optimally placed to respond to the experimental engagement with social and material mediation that has become such a prominent element of creative practice in the arts, music and media'. The aim is to restore questions of aesthetics to the social sciences, now inflected through an analytics of mediation, as well as to 'proffer judgments of value and indicate their basis so as to revivify critical debate, not close it down' (Born 2010b, 199).

At its simplest, a number of chapters (6, 7, 8 and 9) attest to the burgeoning of aesthetic crossings between art and popular music, and music and sound, evident in (post-)digital practices, invariably with reflexive ideological and material investments. Additionally, several chapters explore the mutual mediation of aesthetics and the *social*. Eisenberg (chapter 2) shows how Kenyan popular musicians cultivating new genres through aesthetic experimentation test sounds out recursively on potential fans, so that the aesthetic and social come to be intimately entwined. Haworth and I (chapter 9) examine how a social institution, the record label, can act as an aesthetic subject, and how aesthetic personae can emerge through mutual prehensions between labels and artists. In turn, Snape and I (chapter 6) illuminate how a changing institutional configuration – the merger of two companies, Cycling '74 and Ableton – was implicated in the convergence of two digital music platforms, Max and Ableton Live, with the effect of attenuating the two platforms' former aesthetic and technical diversity.

With regard to aesthetics and *time*, chapters 7 and 8 explore in different ways how a collective will to supersede a hegemonic aesthetic (acousmatic modernism) comes to be elaborated in practices that protend music-historical change. Chapter 8 pursues how such change can be mediated by 'temporalizing' practices (Munn 1992): by musicians' energetic recovery of neglected aesthetic resources as a means at once of reshaping musical present, past and future. Chapters 2, 8 and 9 chart another common mechanism of aesthetic temporality: how musical practices both mediate and are mediated by the temporal dynamics of genre (Haworth 2018; Born forthcoming), tracing this mechanism across African popular, European art and transnational crossover musics.

In terms of aesthetics and *ontology*, Deo highlights in her work on the digital recording and archiving of Rajasthani and Goan folk musics (chapter 4) the ontological chasm between the aesthetic experience of live musical performance and expropriative recordings – given that performance is suffused with religious and political associations as well as embodied, social and material mediations. In this way Deo clarifies how such ontological differences also immanently entail aesthetic differences – aesthetic differences that are occluded by an archival (or scholarly) focus exclusively on sound. Complementing this, my chapter (chapter 8) points to how new aesthetic forms – specifically, the four species of ontological experiment that I identify in British (post-)digital music – can be ignited by the drive to move beyond not only aesthetic but ontological features of a hegemonic music, on the basis of which I suggest that a politics of ontology is today a prominent and generative source of experimental aesthetic change.

It is, however, the expansive array of *material* mediations of the aesthetic that is insistently to the fore in several chapters: in the distinctive aesthetic and material forms apparent in, and ideologies attached to, (post-)digital practices in Argentina and the UK (chapters 3 and 8); in the prominent part played by an aesthetics of the format in chapters 5 and 9; and in the explosion of intermedial practices and intermedial intertextuality at the heart of the aesthetic experiences generated by the internet-mediated genres analysed in chapter 9. Snape's ethnography of the global music platform Max (chapters 6) yields a particularly sustained analysis of the mutual mediation of aesthetics and technology. Arguing that any musician encounters Max with 'situated musical knowledge' (p. 222), Snape observes that 'Max is only a partner in, or a co-producer of, any musical or artistic practice in which the software is employed' (p. 259). It follows that each varied instance of Max practice described – Mark Fell's patch, Al's 'immersive patching practice', Holly Herndon's

1015 Folsom performance – dramatises 'how difficult it is to make an interpretive "cut" (Barad 2007) between technicity and musical expression' (p. 258). Snape's analysis of three commonly-used techniques lends weight to his interlocutors' sense that, sonically, the platform generates 'a pervasive sense of "Max-ness"' (p. 242). Yet the distinctiveness of individual musicians' Max-mediated sounds attests to how the software morphs through encounters with each musician's particular musical history and culture. If the chapter shows that it is no longer possible 'to equate technical change with invention', it also makes plain that 'Max's inventiveness [must] be judged … in the expanded terms of the assemblage' as it subtends aesthetic possibilities (p. 259).

A final take on materialist aesthetics, and a segue into the next section, comes from Valiquet's work on Montreal's nonacademic experimental noise scene. As he shows in publications complementing his chapter in this book, the scene is fetishistically engaged in mining aestheticised 'fine differences' between alternative sound formats, manifest in the handcrafting of hybrid set-ups in which digital technologies may either be absent or integrated in convoluted arrangements with analogue technologies, physical devices and/or old media. In such set-ups, the analogue invariably 'marks a judgment of value against the digital … which can only be made sense of against a particular cultural background' (Valiquet 2018, 105), notably, ambivalence towards or negation of acousmatic modernism. Valiquet's reading of these practices via the 'multilayered' work of experimental rock-conceptual art-noise trio K.A.N.T.N.A.G.A.N.O. vividly illustrates the stakes. He analyses an extraordinary solo performance by a member of the trio, Alexandre St-Onge, titled *Aimer la concrescence* (Valiquet 2018, 107). Discursive mediation is in play among the mediations composing the assemblage: the title refers to the philosopher Gilbert Simondon's theory of technological evolution via individuation, a process of 'concrescence' in which 'abstract' technologies – made up of differentiated components that can be taken apart and substituted – evolve into 'concrete' machines that are 'entirely unified' (Simondon 1958, 16), 'the organs [being] more or less integrated into the whole', so that the machine's functioning tends 'to become a global functioning' (Hart 1980, xii).

> [St-Onge] stood hunched in front of a microphone, his bass guitar lying on the floor in front of him, humming and singing while breaking a bundle of wooden sticks in his mouth. As he vocalised the pieces of wood fell from his mouth and struck the strings. After

> a few minutes he repeated the action with a sheet of paper, chewing it to pieces and dropping it on to the strings of his bass. The sounds of voice and bass were not mixed separately, however, but triggered a feedback system running on Ableton Live and an analog synthesiser. He controlled the modulations with a Wiimote [Nintendo game controller] attached to his back. The surreal series of movements and vocalisations, added to the fact that he rarely touched the instruments, gave the slowly evolving composite a dream-like, disjointed quality. (Valiquet 2018, 107)

Valiquet draws out how the various material components of St-Onge's 'abstract' set-up point to distinctive generic attachments that have to be read individually. He continues by observing that K.A.N.T.N.A.G.A.N.O.'s 'citational use of digital technologies' rejected 'any belonging to computer music' while also 'representing computer music (if ironically) for their experimental rock audiences'. Valiquet seems to be arguing, in a similar way to Haworth and I in chapter 9, that grasping the aesthetics of Montreal's noise scene entails deciphering the often ironic or parodic cultural-historical connotations mediating the heterogeneous materials participating in the assemblage.

On material/technological mediation

Material multiplicity and entanglement

Valiquet's nuanced reading of St-Onge's performance points graphically to questions of technological and material mediation, enabling a transition to the next comparative facet of the MusDig research. Two assumptions recur in discussions of digital music technologies, and both are problematised by our studies. The first is the idea that digital music is in some way immaterial; indeed, digital music might be thought to be doubly dematerialised – in that music is often considered the least material of the arts, and in the conviction that the MP3 format wrought a 'dematerialization of the musical object' (Auslander 2001, 77). A second assumption turns on the notion that the 'digital' refers to discrete technologies that function self-sufficiently and can be analysed in themselves. Jonathan Sterne rightly urges caution in the face of such reifications. Rather than privilege the digital, he contends, digital technologies 'are best understood as always bound up with a range of cultural practices and other – "analog" – technologies', so that accounts

are needed that address them ‘as an element in a larger cultural formation’ (Sterne 2006, 95). Moreover, if ‘digital’ and ‘analogue’ appear to stake out an oppositional dualism, ‘the connections between digital technologies and all the technologies that came before them run at least as deep as the differences’ (Sterne 2016, 35). Sterne’s arguments are in sync with those from the digital humanities who diagnose the distributed materiality of digital media, evident, in Johanna Drucker’s words, in ‘the co-dependent, layered contingencies on which the functions of drive, storage, software, hardware, systems, and networks depend’, elements composing ‘larger systemic relations in which multiple materialities are at play’ (Drucker 2013, 1).[3]

These astute dictums are fully in tune with our ethnographies. Several chapters expand on them by attesting to the burgeoning of a plenitude of post-dualist material practices and imaginaries in the (post-) digital present. To be sure, analysing music’s material mediation must take account of complex and ubiquitous arrangements of digital and analogue music technologies; and yet our studies show that such an analysis may also have to include a host of other material actants – inter alia wooden sticks, paper, Wiimotes, magnets, capacitors, breadboards, Fisher-Price baby monitors, cardboard boxes, multielectrode arrays, tree roots, fungal mycelia, wind, grasses, fabric swatches and oil drums. Accounting for music’s material mediation today demands, then, that we recognise ramifying hybrid set-ups of digital-and-otherwise materialities composed not only of digital and analogue technologies but myriad material and nonhuman entities and processes through which music has life and is experienced (Bennett 2010; Born 2018b; Born and Barry 2018, 475–6).

The chapters contribute in several ways to existing approaches to such digital-and-otherwise materialities. To digital anthropology and digital media studies they hold out original perspectives on the interrelations between aesthetics and digital materialities, as highlighted in this and the previous section. In addition, as the coming pages make clear, the chapters offer digital anthropology new ways of conceptualising the interrelations between the material and social, resisting any tendency either to collapse them or to treat them independently. And to digital media/software studies, which have often analysed digital materialities by disentangling them and homing in on separable entities or processes (Brügger 2009; Fuller 2008; Peters 2016), the chapters make the reverse move, embracing the multiplicity of the internet and digital music assemblages, and illuminating how they are composed by the interplay between material and aesthetic, discursive, social and political mediations

– an optic in which digital materiality is assumed to be heterogeneous and impure.[4] The digital is, then, always encountered entangled in analogue technologies and other materials; digital materialities participate, in turn, in broader sociomaterial arrangements.

That digital music assemblages are multiplicities is beautifully illustrated by what are often portrayed as 'single' technologies: digital audio workstations. The popular DAW Ableton Live, Patrick Valiquet has shown, is not one thing. At the user interface level Live is made up 'of "devices", "modules", "clips", "envelopes", "sessions", "settings", "buttons", "knobs" etc.; [and] at the code level of "functions", "libraries", "plug-ins", "drivers" etc.' But Live is a multiplicity in two additional ways: in being available in a number of versions, and in how its functioning is 'radically contingent on the hardware and software' configuration in which it operates. Thus, 'the speed of the CPU, the RAM and Hard Disk capacities, the sound card resolution, operating system version, and the set of effect plug-ins, device drivers, and interface softwares … all have an effect on what kind of thing Live will be and do' (Valiquet 2012, 2–3). Valiquet develops these points by comparing three Montreal musicians' uses of the Live timeline interface. One arranged 'multiple tracks of audio across the timeline, looped the resulting aggregate, and then spent most of her time modifying effect plug-ins until she discovered the sounds she wanted. The timeline afforded her a kind of static temporal field upon which to modify sound as if sculpting a mass of plastic material.' A second 'prepared sound material using other programs or recordings and then recorded short, layered figures arbitrarily onto the timeline using a MIDI keyboard. The timeline afforded him a canvas on which to record repeatedly … gradually accumulating gestural blocks of varying length … [His music] stuck close to acousmatic convention of permanent timbral and gestural transformation.' A third musician used 'the software as a kind of translation engine for a planned solo improvisation in the context of a science-fiction themed theatrical performance'. To grasp why each use made sense aesthetically, Valiquet observes, demands a move beyond any idea that Live has inherent 'affordances' to the 'emergent (i.e., irreducible to properties) ways that it acts' as a 'mediating node in a broader technological and aesthetic assemblage' (Valiquet 2012).

Joe Snape (chapter 6) zooms in closer on the internal architecture of music production software in his incisive anatomy of the sociomaterialities of the global platform Max, employing post-positivist empiricism to enable his ethnography to arbitrate between alternative theoretical perspectives from science and technology studies (STS). His focus is on a 'technically simple' Max patch made by musician Mark Fell which produces an aesthetic effect central to Fell's music: a 'repeated pitch of constantly and randomly

changing duration' (p. 228). The patch is itself a multiplicity: it shelters a series of complex internal relations that are not readily apparent from the Max GUI. The multiplicity takes the form of a dynamic ecology of intertwined paths of data flow – a dense entanglement of digital processes. Snape adduces three representations of the patch: the first as it appears in the GUI, the second distinguishing human from nonhuman actants among the patch's component processes, and the third breaking the patch's functioning down into 'alliances': 'groupings between objects of different type and function that collectively perform a key task' (p. 229), dynamic subsystems exhibiting recursive and nonlinear relations. Thus, 'each alliance, although performing a local operation, is at root reliant both on those that precede it and – by virtue of the patch's feedback mechanisms – on those that follow it' (p. 231). Of four alliances, Snape shows that two consist of hybrid human-nonhuman groupings, while two 'are exclusively nonhuman [and] fulfil important and complex tasks', their actions exhibiting 'a primitive self-organising quality … – a capacity to produce a wide range of meaningful outputs based on a single general specification'. In this light, 'the patch may seem to be vastly more ingenious, industrious and productive [than Fell] in its contributions to their "co-productive" entanglement' (p. 231). However, Snape identifies a fifth alliance consisting of 'the relationships between **noteout** [the sound output object], the MIDI engine, Fell's listening, Fell's musical ideas and proclivities, [and] **toggle** and **integer**', inputs controlled by Fell (p. 230). Given the nonlinear dynamics, Snape observes, Fell's control of just two variables 'bleeds influentially into every corner of the system' (p. 231). Parsing this analysis through several theoretical lenses on the nonhuman drawn from STS, Snape ultimately endorses Lucy Suchman's 'rebalancing towards the human' when, against any symmetry of human and nonhuman, she stresses their 'mutuality' and the 'particular accountabilities' of human actors (Suchman 2007, 270) – to which, for Max, must be added 'the irreducible power of aesthetic reflexivities' (p. 233). Snape and Valiquet convey, then, how the multiplicities that are digital music assemblages combine complex, nonlinear processes of different duration and scale unleashed among nonhuman and human mediators – assemblages in which the 'only unity is that of a co-functioning' (Deleuze 1987, 69), and where the aesthetic situatedness of human actors must be taken into account.

Sociomaterial status hierarchies: concrescence – anti-concrescence

Comparative analysis yields additional angles on the *social* mediation of the material assemblages identified in our ethnographies. In particular, it

points to the existence of differences manifest in sociomaterial hierarchies and stratifications discernible within and between the global South and North. Snape's ethnography of Max (chapter 6) highlights a first sociomaterial (and aesthetic) hierarchy characteristic of the North in the guise of a high-low differentiation. As Snape notes, Max and similar music environments are taught in academic settings where they are 'considered to be the engines of complex and demanding musical and programming work' (p. 226); they are invariably posed by their advocates against the 'low' end represented by DAWs like Live, Logic and Reason, associated as these DAWs are with the production schedules and rhythmic, pitch-based aesthetics of popular and commercial musics. But a further status hierarchy haunting our Northern ethnographies complicates the picture: for Max's hold in the universities, its widespread use by academic electroacoustic musicians, and perceptions among women musicians that Max is arduous and favours male-gendered STEM skills, have together fed the diverse counter-practices evident in experimental sound art and noise scenes – notably those post-digital creative practices that, deploying arrays of low-tech, everyday, found and abject sound-making materials, abjure the standardised, black-boxed functionalities of corporate digital technologies. What is playing out here is an antagonism between the material philosophies and practices of noise and sound art, and the 'neutral-instrumental', 'functional-engineering' music research paradigms characterising Max environments. It is just this antagonism that fuels the fourth species of ontological experiment, espousing material *détournements*, that I portray in chapter 8 (pp. 353–9) – practices that at the same time flesh out an economy of avant-garde and subcultural capitals circulating among practitioners.

Equally striking is how these dual status hierarchies map on to Simondon's ideas of abstract and concrete technologies and of concrescence – the growing unification of the 'functional sub-systems' of the technical object (Simondon 1958, 31) – as a historical tendency. The DAW suggests itself as the epitome of a concrete technology. In DAWs like Live, writes Nick Prior, 'operations and techniques that were once separate have been unified', enabling 'musicians to write, record, mix, master, upload, distribute, promote, download, and listen to music using a single unit'. As with Eisenberg's analysis of the Kenyan 'creative producer' (chapter 2), Prior notes that such concrescence[5] brings with it an 'occupational folding [where] tasks that were discretely allocated' have merged (Prior 2010, 403). Certainly, if we attend in Simondon's terms to the growing 'autonomy' of the technical object, concrescence appears an inexorable force in the evolution of commercial digital music

tech. Take the concrescence of the recent vocal-production plug-in Nectar 3, made by iZotope, 'experts in intelligent audio technology', which integrates and automates relations between previously separate 'modules' of the vocal chain: pitch correction, chorus, flanger and phaser effects, equalisation, compression, reverb and so on.[6]

In contrast to the concrescence of Nectar 3 or the DAWs stands a platform like Max, offering an abstract interface in the guise of flexible modular parameters and controls with which, through apparently infinite combinatorial opportunities, users can configure bespoke patches and environments. More accurately, Max offers a concrete version of the abstract: a formatted set of programmable functions and syntaxes to produce 'objects' that are then arranged to generate and process sound. In other ways, too, Max exhibits concrete tendencies, for instance in its architecture of 'encapsulation', which integrates many individual objects into higher-order 'easily-collaged pseudo-objects' (chapter 6, note 25, p. 261). Yet, as Snape conveys ethnographically, skilled users methodically avoid and work around Max's abstraction, copying ready-made objects rather than building them anew in pursuit of a fluent and improvisational coding practice that unites programmability and musicality (p. 238). Max is, then, ambiguously abstract: it presents a *concretised abstraction*. And this in turn modifies Simondon's unlinear model of technological evolution, suggesting that in music technologies, rather than sequential states, concrete and abstract have become relative, contending and reversible states along a spectrum, and can even – as in concretised abstraction – be nested qualities. Yet such qualities are finally perspectival; for when used or 'de-scripted' (Akrich 1992) by those (often women) sound artists who find Max's 'mathematical' demands rebarbative, its notionally abstract architecture can be experienced as highly concrete – as too tightly tethered to a particular technical-ontological universe to reshape creatively at will.

It follows that rich expressions of an abstract technological sensibility are evident in the reflexive seriation of vernacular, hand-crafted gadgets and things along with old media, non-standard formats and environmental materials in the practices of experimental sound artists and noise musicians, practices that seek to maximise material heterogeneity and detachability, often working conceptually with the trope 'assemblage' itself. Such disparate set-ups speak not of a condition *prior* to concrescence but of *anti-concrescence*: a willed supersession of gleaming, black-boxed corporate digitalia – and thus a reversal of Simondonian time. This is the abstract as a Northern material politics, in some cases a politics of ontology (chapter 8, pp. 353–9), that through

ironic and marginal acts performs the sublation of commercial music tech. Yet it would be wrong to read aesthetic qualities directly off the abstract and concrete – as though the DAWs' concrescence, as critics would have it, can be equated with impoverished aesthetic resources and the abstraction of sound art set-ups with rich aesthetic resources. For however concrete, in the South and North, DAWs too form part of digital music assemblages that in contingent ways mediate and modify their concrescence, and in which they become mere participants.

Sociomaterial stratifications: scarcity – plenty

A different dualism stalks the differentiation between North and South, that of conditions of technological and economic plenty or scarcity, a stratification attesting again to the social mediation of digital music technologies – specifically, their mediation by the social and economic inequalities that traversed our research sites. Plenty and scarcity signal here both real differences in available resources and the differential experience of those conditions as lived.

Scarcity haunts Alexandrine Boudreault-Fournier's Cuban ethnography, which portrays a felt reality of technological exclusion and 'lag' among musicians and in the wider population. 'Lag' refers to 'the effects of being temporarily located outside of a loop, … excluded from a system of circulation' (Boudreault-Fournier 2013, 1): that of access to the internet and, among musicians, to the DAWs and plug-ins they believe are needed for further musical development. Stratification is evident, too, within Cuba through the figure of the 'server' (*servidore*): a specialist in a certain genre who has online access, possesses valuable digitised music data, and acts as the point of origin for hand-to-hand data distribution among her/his social networks via memory sticks or hard drives. Boudreault-Fournier narrates the story of the arrival of dubstep in Cuba via the *servidore* DJ Joyvan, an electronic music specialist who copied a single dubstep folder from the memory stick of a visiting Turkish friend in November 2011. Within a few weeks the folder had been copied and 'spread among a large circle of producers and consumers' across the island. The sound of a leading dubstep artist, Skrillex, became a model for Cuban connoisseurs, who sought to replicate it; yet they felt impeded by not having access to the particular DAW – Fruity Loops 10 – and associated plug-ins they learnt would enable them to emulate the Skrillex sound. 'At the time Fruity Loops 8 or 9 was available on the streets of Havana', noted a DJ, 'but it did not have the Gross Beat [plug-in] so it was almost impossible for us to make

dubstep of quality' (Boudreault-Fournier 2013, 5). Eight months later, in 2012, Fruity Loops 10 became available at street level, and with it the Gross Beat. At last, Cuban DJs could make the Skrillex dubstep sound they ardently desired, although it was mid-2013 when yet another plug-in, Dblue Glitch, became available, which, in the words of a musician, finally allowed Cubans to make 'the *real* Skrillex sound' (Boudreault-Fournier 2013, 6). 'Lag', the affective state of 'not being in the same present time and space as the rest of the world', undoubtedly fuels creative agency; for a leading figure, the absence of key plug-ins 'obliges us to develop other ways of doing things, and this can create different aesthetics … [Yet] the fact of not having the internet is decisive; the disadvantages of not being connected to the world through the internet are real' (2013, 6).

Technological plenty, in contrast, is spectacularly on show in the Northern academic centres of digital art music focal for our research in Montreal, the UK and Europe (chapters 7 and 8), in which dedicated performance spaces replete with state-of-the-art audio technologies, temples to electroacoustic art music, vie for technical supremacy. Hence, the Sonic Lab, centrepiece of SARC, Belfast (chapter 8), part of a £4.5 million infrastructure built in 2004, is a 'specialist acoustic space designed to provide a unique and exciting listening experience, … the auditory equivalent of an IMAX cinema. Forty-eight loudspeakers … project and move sounds throughout the space, including underneath the audience. No other auditorium for sonic art performance and experimentation currently exists with this revolutionary feature'.[7] Also exemplary is the MUMUTH concert hall, University of Music and Dramatic Arts, Graz (chapter 8, p. 348), which features an Ambisonic playback system composed of 29 suspended speakers on motorised pantographs with 360-degree flexibility as well as additional speakers and subwoofers positioned around an elliptical dome so as to produce 'highly innovative and variable acoustics', including the ability to switch from the dry 'natural' acoustic 'to church/cathedral reverberation within 10 milliseconds'.[8] It is against this insatiable drive for technological power that Northern post-digital subcultures perform their material politics, renouncing both modernist audio-tech cathedrals and the corporate digital technologies that, in their ubiquity, have shed their cachet. In the South, plenty is also experienced, but takes other forms: mobile phones, laptops and DAWs – initially encountered through an affective veil of 'lag' – have become quotidian devices, their profuse capacities for experiencing and creating music highly prized, and, in situations of continuing 'lag' like Cuba, magnets for collective desires.

Yet this is not the only stratification of technological infrastructure, access and knowledge apparent in the chapters. As remarkable are the differences played out between Southern metropolitan and subaltern institutions and peoples. In Aditi Deo's study of North Indian folk music archives (chapter 4), this is obvious in disparities between the material culture and infrastructure of the Archives and Research Centre for Ethnomusicology (ARCE), the New Delhi-based, internationally funded academic archive, and local archives in Rajasthan and Gujarat. Given a weak public infrastructure and frequent power cuts, the ARCE has an in-house generator and an uninterruptible power supply supporting its environment control equipment and the electronics necessary for digital processing and storage. Physically, the ARCE comprises a temperature- and humidity-controlled storage vault, two audiovisual labs, a room for the RAID (Redundant Array of Independent Disks) and LTO (Linear Tape-Open) systems, a director's office, and a large office for work on databases, cataloguing and so on. Technically, the ARCE upholds international standards; with much of the archive in analogue formats, work in the labs centres on monitoring the digitisation of analogue audio and video, the transfer of PCM (pulse code modulation) and DAT tapes to digital formats, and the transfer of digitised files to RAID and their back-up to LTO. The very profusion of formats and media, the care accorded to transfers, and the scientific capital manifest in technical skills speak to the multiple capitals and ambitions of the ARCE. That they were there from the outset is clear in early decisions to invest in digitisation before digital media were readily available and in the use of PCM in the 1980s to record audio as digital code on VHS tape at 16 bit 44.1 kHz, at the time the best available format. These were pioneering decisions for a music archive not only in India but globally, as few were then digitising their analogue holdings. Of course, they also wove the ARCE as a comprador institution into the relentless churn of formats and infrastructures and the transnational technological dependence demanded by the global tech corporations governing digital culture.[9]

If, outside institutional settings like the ARCE, India's cities embody a 'pirate modernity' (Sundaram 2010) manifest in 'a deluge of … cassettes, CDs, MP3s, cable television, gray-market computers, [and] cheap Chinese audio and video players' (Sundaram 2007, 54), then, as Deo shows, small town and rural India, where local folk music archives are based, host a technoscape that is materially different yet again. Such places are inhabited by fragile, extralegal and what might be deemed amateur technological assemblages.[10] If mobile phones are ubiquitous, widely used for audio and video recording, circulation and playback,

computers are limited mainly to professional and business circles. Towns may be on the broadband grid but have few cybercafés or operative internet connections. Here, folk music collection and dissemination depend on initiatives that 'have less than the basic technological necessities cobbled together as and where required for bare functionality'. They demonstrate *jūgād*, translated loosely as 'improvisation' or 'innovation' within existing resources, a 'technological/material creativity born of necessity' (Deo 2011, 3). In this vein, the Vaacha museum-archive at the Adivasi Academy devoted to tribal self-representation, although funded by the Ministry of Tribal Culture and international NGOs, has a rudimentary technical infrastructure. Large parts of its collection depend on the low quality, perishable writable-CD format, and performances are recorded using mini DV camcorders or surreptitiously on phones. In the absence of the internet, dissemination often relies on regional bus drivers and touring wedding orchestras distributing CDs. Archives of this kind, invariably initiated by higher-caste intellectuals to preserve the music traditions of lower castes, tend to be maintained by curators with basic digital literacy, despite occasional internships at the ARCE. Lack of language skills proves a block to digital inclusion: for Adivasi Academy curators, the ARCE was 'an English and very slightly Hindi environment', making it hard to follow the training. Moreover, little of what they learnt could be applied: the ARCE 'assumed large budgets and infrastructure, whereas the Academy had very few resources'. As an Adivasi curator noted, 'those who know tribal culture do not know technology, and those who know technology know nothing about tribal culture' (Deo 2011, 14). Pervasive inequalities and a correlative stratification of technical knowledges mediate the uneven technoscapes.

Comparison between South and North adds a final ironic twist, recapitulating and illustrating a point made in the introduction in response to *Remapping Sound Studies* (pp. 18–19): that the 'meaning' of a given hybrid assemblage cannot be read off its materiality. For what may appear to be similar heterogeneous material arrangements – see Figures 10.1 and 10.2: the first, a set-up for telecasting local recordings of folk music performances by a cable channel serving a small Indian town; the second, a performance set-up for Tudor's *Rainforest I* created by British and European sound artists as a prototype 'hybrid resonant assemblage' [11] – will have radically different 'meanings' attendant on distinctive material conditions, cultural histories and ontologies. In rural India, the 'abstract', disordered set-up testifies to a chronic lack of economic and technical resources while exhibiting *jūgād* and furnishing a subaltern public sphere. In the UK, Europe and Montreal, a similarly abstract set-up speaks to a



Figure 10.1 Local cable TV channel set-up, Taloda, Maharashtra, India (2011). Fieldwork image.

Credit: Aditi Deo.

reflexive, philosophically-imbued practice that rejects the gleaming black-boxed promise and means-ends telos of digital plenitude – one of numerous articulations of a post-digital material aesthetics and politics (chapters 7, 8 and 9).



Figure 10.2 'Hybrid resonant assemblage': sound art performance set-up, London, UK (2009).

Credit: John Bowers.

On social mediation

From the crisis of the social to four planes of social mediation

A final vector of comparison between the MusDig ethnographies turns on music's social mediation. In earlier writings I outlined a heuristic theoretical and methodological scheme, to be taken to empirical research, in which the relationship between music and the social is apprehended as multiple, and specifically as taking the form of four planes of social mediation of music (Born 2005, 2011, 2012). I was responding through music to shifts in anthropological theory. In the late 1980s Marilyn Strathern identified a crisis in conceptions of the social, criticising the inadequacies of the twin reifications 'society' and 'individual'. She led new thinking by espousing the 'concept of sociality as the relational matrix which constitutes the life of persons', stressing the continuing need to theorise 'social organisation [and] collective life' (Strathern 1990, 8–10). In her Melanesian ethnography Strathern took 'sociality to refer to the creating and maintaining of relationships', observing that certain

collectivities present ‘an image of unity … created out of internal homogeneity, a process of de-pluralization’, and that Melanesian social life consisted ‘in a constant movement … from one type of sociality to another’ (Strathern 1988, 13–14). Also influential in diagnosing a crisis of the social was Bruno Latour in his rejection of a Durkheimian or Marxian ‘sociology of the social’. Instead he proposed a ‘sociology of associations’, a non-teleological account of the contributions of nonhumans and humans to assembling the social, and one that maps the ‘many … contradictory cartographies of the social’ (Latour 2005, 34). Both writers initiated new analytical topoi. Their influence is synthesised in Henrietta Moore and Nicholas Long’s *Sociality*, where sociality is conceived as a ‘dynamic relational matrix’ (Long and Moore 2013, 4) exhibiting plasticity and generativity, rather than as embodying rules or structures. Moore and Long take as a central problem ‘why human sociality is capable of taking many different forms’ (Long and Moore 2013, 8). Yet while these writers identify diverse ‘cartographies of the social’, they leave unresolved the nature of their interrelations, as well as how to parse this variety so as to make it conceptually tractable. The language of socialities and associations, moreover, can elide differences between forms and scales of social relations, as well as between their transient or enduring nature.

Strathern expands on the relation as a generative abstraction that has (at least) two properties. First, she points out that relations exist as abstractions – for example, ‘social relations’ – that can nonetheless be observed in concrete forms and may also enter into further relations – as, for instance, when social relations enter into relation with music by transforming (or mediating) it, and vice versa, when music enters into relation with social relations and transforms (or mediates) them, two-way processes that are captured in the idea of music’s social mediation. She comments, ‘to the extent that an abstract principle [relation] makes a concrete appearance, then what is abstract and what is concrete fold into each other: that which is inferred from observation comes to have its own “observable” characteristics’ (Strathern 2018, 173–4). Note how her depiction of the two-way movement between the concrete (empirical observation) and abstract (inferred relations) recalls the idea of post-positivist empiricism outlined in the introduction to this book. Second, a central property of the relation is that it permits the analyst to cross scales; it is a way of inferring links between entities of micro and macro scale, entities that may themselves be relations, and Strathern illustrates this by recalling how archaeologists track processes ‘along several quite different temporal and spatial scales’ at once (Strathern 1995, 21). Hence,

'the relation as a model of complex phenomena … has the power to bring dissimilar orders or levels of knowledge together while conserving their difference' (Strathern 1995, 19).[12]

Music is a pliant medium for advancing this thinking. The framework of four planes adduces four analytical groupings from the manifold socialities enlivened by music, indicating the productivity of crossing scales when deciphering social mediation. In this way it answers 'a fundamental theoretical question: how to move beyond the tendency … to take the observable micro-social patterns of musical experience and behaviour … as amounting to the entire socio-musical reality' (Born 2005, 14). The first two planes identify socialities and social imaginaries engendered solely by musical practice and experience. They are, first, the real-time socialities set in motion by performance, recording or listening events, including those manifest in musical ensembles, or between and among performers, audiences, producers and composers, as these socialities enact distinct musical divisions of labour. The second plane recognises musically-imagined community: music's capacity to aggregate musicians and listeners into virtual collectivities or publics based on musical and other identifications, collectivities that may be more or less heterogeneous and enduring. The last two planes identify social formations and institutions that both exist beyond and 'get into' music, amounting not to an external 'context' in so far as they directly participate in and condition musical experience. The third plane opens on to intersectional analysis (Bull 2019; Crenshaw 2017; Hancock 2016; Salem 2016): it identifies how music refracts and is refracted by pervasive social relations and identity formations apparent in differences, inequalities and hierarchies of class, race and ethnicity, gender and sexuality, religion and nationality.[13] The fourth plane encompasses the institutional and political-economic forms that support music's production, reproduction and transformation, including nonmarket and market exchange, public cultural institutions, elite, philanthropic and religious patronage, and late capitalism's multipolar cultural economy.

Each of the four planes has a certain autonomy, and each may be the locus of the reproduction or transformation of prior social forms. At the same time, the four planes are entangled with one another in contingent and nonlinear ways through relations of synergy or catalysis, conditioning or causality. It is, then, 'the complex potentialities engendered by both the autonomy of and the mutual interference between the four planes that are particularly generative of experimentation, transformation, and emergence in musical assemblages' (Born 2012, 267). Moreover, as will become clear, all four planes have the potential to mediate music's aesthetic, ethical and

political operations (Born 2017) – indeed, all four planes can become a surface on which a politics can foment. To be clear: this is not to say that a politics will always arise, in this way collapsing the political into the social; it is to say that each of the four planes has the potential to incite a politics. In sum, mixing Deleuzian assemblage theory with elements of feminist and post-Marxist social theory, the anti-reductionist framework of four planes of social mediation advances a conceptual apparatus for analysing the social in music that retains a concern with scale and power, while also elaborating how music's socialities can be the locus of experimentation and invention.[14] On the one hand, it sets empirically to work the maxim that 'relations of power are constitutive of the social' (Mouffe 2000, 125): rather than conceive of social relations in the vicinity of music as organic or oriented to community (Shelemay 2011; Turino 2008), it demands that we probe empirically and elaborate conceptually how they may also be constituted by difference, hierarchy and inequality. On the other hand, it conveys how it is both the irreducibility of and the interferences between the four planes – their capacity mutually to synergise and compound as well as to exist in difference, tension or opposition – that generates spaces of agency and potential invention in the musical assemblage. Yet there is nothing sacred about the number four; additional planes of music's social mediation may become conceptually necessary, and later in this postlude I identify a fifth.

In addressing the third plane – which recognises how music refracts pervasive social relations while it may also host experiments in transforming them – the framework of four planes confronts anthropology's challenge of conjoining 'emic' and 'etic' perspectives on social relations. Here I take bearings from Strathern's conviction that the encounter between anthropology and feminism has 'provided a significant impetus [to both] the investigation of power relations and the exploration of indigenous models', and that 'in dealing with relations between the sexes, one is dealing with social relations at large' (Strathern 1988, 35). Yet by 'dissolving the notion of society', feminist anthropology has encountered 'resistance', for in 'asking pluralistic questions about the constitution of ... rules, values, and models, feminist presumptions simultaneously tackle the self-description of anthropology as to do with the holistic analysis of society' (Strathern 1988, 36). Nothing is more to the point in energising new approaches to analysing the social in music that chart both the diversity of musico-social relations of power and actors' imaginative efforts, by doing music differently, to reshape them.

Theorising the fourth plane: on music's institutional, organisational and political-economic forms

Of the four planes it is the fourth, encompassing music's institutional, organisational and political-economic forms, that is least developed in my earlier writings.[15] In the MusDig research this plane comes vibrantly to the fore, making it vital to fill out conceptually. The chapters attest in both the South and North to how protean music is in terms of generating and depending for its existence on a diversity of institutional and organisational forms, as well as how fundamental they are in enabling music's creation, dissemination and reception. At the same time, our studies convey the astonishing variety of such institutions in terms of size and scale, informality or formality, and transience or longevity. In drawing together institutions, organisations and political economy, the fourth plane might be thought so diffuse as an analytical category as to be meaningless. To combat this view and justify bringing these elements together I draw on decisive contributions from feminist and post-Marxist social theory. An overarching aim of the coming pages is to supersede the tendency in recent writings to theorise the political economy of digital music in the terms of neoliberal capitalism or global copyright industries, basing this characterisation primarily on their manifestations in the North (Leyshon 2014; Wikström 2014; Taylor 2016). MusDig revises this tendency in three ways: first, by abjuring its totalising flavour, which obscures the diversity of socio-economic forms enlivening planetary musics; second, by highlighting the critical role of institutions and policies in constituting this political economy; and third, by attending to the South as well as the North.

The first revision draws energy from a series of alternative theoretical framings. The most important is that of feminist economic geographers J. K. Gibson-Graham who, inveighing against teleological and totalising discourses on Capitalism, observe that since poststructuralist theory 'the political subject and the social totality have been rent apart and retheorised as open, continually under construction, decentered, constituted by antagonisms, fragmented, plural, [and] multivocal' – yet 'Capitalism has been relatively immune to [such] radical reconceptualisation' (Gibson-Graham 1996, 253). Leveraging anti-essentialist thought they ask, 'How do we begin to see this monolithic … Capitalism … as a fantasy of wholeness … that operates to obscure diversity and disunity in the economy and society alike?' (1996, 260). There is, then, 'no Capitalism but only capitalisms' riven by 'multiplicity and contaminations'. In the Derridean vein of 'thinking difference without opposition' (1996, 245) they note that, although

non-commodity production and non-market exchange make up 'large portions of the economic' activity on which capitalism depends, they lack visibility (1996, 245) and, through 'discursive violence', are portrayed merely as functional for 'capitalist reproduction' (1996, 12). As an alternative, Gibson-Graham call for research attentive to a 'radically heterogeneous economic landscape' made up of local economic organisations and practices, 'from cooperatives to local currencies to community credit institutions' (1996, vii). Against 'the subordination of local subjects to the discourse of (capitalist economic) globalization', they pose a 'vision of the "diverse economy"' (1996, xiv). Incubating similar ideas in anthropology, the *Gens Manifesto* authored by Laura Bear, Karen Ho, Anna Tsing and Sylvia Yanagisako revitalises 'feminist substantivist approaches to "the socio-economic"' against reductive analyses of global capitalism. 'Instead of taking capitalism ... as an already determining structure, logic, and trajectory, we ask how its social relations are generated out of divergent life projects' (Bear et al. 2015, 1–2). Although they cite Gibson-Graham, Bear et al. go further in upholding anthropology's insistence on the immanently social nature of the economy, in this way dissolving the very category of the economy into a plethora of 'life practices, relations, experiences, and contexts – shaped by kinship, charisma, sentiment, status, race, gender, class, nation, etc.' (2015, 3).[16]

It is striking that variants of these arguments have arisen in research on music, adding conceptual and empirical heft. A fine example is Martin Stokes' translation into music of Dipesh Chakrabarty's critique of totalising Marxist accounts of global capitalism. Drawing on ethnographies of the circum-Mediterranean region, Stokes shows that musical worlds resistant to commodification permeate the whole region. On this basis he rejects 'teleological, historicist assumptions about the inevitably dominating "incursion" of money into musical worlds' (Stokes, 2002, 139), counteracting any anxiety that 'capital and the cash economy ... [erode] the bonds of sociality that music plays such an important role in forming' (2002, 146). In this light, he avers, noncommodified music and musical labour are neither pre-capitalist nor secondary, but constitute an 'excess' that is 'not only connected to capital's present but ... actively constitutive of that present'; indeed, they participate in the 'turbulent dialectic' that generates the 'complex and plural cultural worlds we actually inhabit' (2002, 150).

Another variant stems from debates in popular music studies over changing rates of concentration in the music industry, revising Adornian accounts of popular music as a monolithic 'culture industry'. Instead, writers from the mid-1970s to the 1990s drew attention to the

differentiation of the music industries (Peterson and Berger 1975), with complex interdependencies but also autonomies marking relations between multinational, mid-size and small 'independent' record companies (Hesmondhalgh 1996). David Hesmondhalgh added an emphasis on the 'particularly strong ideological commitment' among musicians and others 'to the forging of alternative institutional spaces' (1996, 476), observing the significance for a political economy of music 'of how organisational strategies affect the autonomy of workers and cultural outcomes' (1996, 484). Yet having established a differentiated musical capitalism, the debates return repeatedly to the telos of Capitalism, the pivotal issue being whether independents challenge the majors' power and alter the structure of the industry or not – to which the answer is invariably no. What gets lost here is the autonomy potentialised by 'alternative institutional spaces' hosting diverse 'organisational strategies' which, industry-changing or not, can nonetheless become vehicles for musicians' artistic, social and political aspirations – and thereby shape musical 'outcomes'.

A final contribution puts flesh on Hesmondhalgh's observation: Stephen Graham's study of the musical 'underground', a 'distinct zone of cultural activity' between popular and art music that can be traced from the 1960s and, he argues, thrives, if transformed, in the digital era (Graham 2016, 8, 12). Graham portrays the underground as having 'at least partial autonomy from the state and its institutions' as well as offering 'an alternative or supplement to capitalist modes of exchange', sometimes manifest in 'bottom-up, non-profit-oriented entrepreneurialism' or 'petty capitalism' (2016, 12, 59; cf. Born 2013b). Empirically, his book chronicles the variety of institutions and organisations forged by underground musicians and intermediaries as they try to gain a living from music. For central to underground identity and activity since at least the 1960s have been a host of alternative institutions: independent record labels, radio stations, mail order networks, publishers, musicians' collectives, fanzines, festivals and venues – attesting to music as a petri-dish for Gibson-Graham's 'diverse economy'. And for the actors, *pace* Bear et al., this *is* self-consciously a lively economy, albeit one marked by precarity, portfolio careers and giant disparities in public subsidy (Graham 2016, 68–69). Graham charts the myriad organisations making up the underground as it burrows 'away in tiny venues, dark corners of the Internet, and small festivals … largely independent of mainstream institutional patronage' (Graham 2016, 70).

Two anti-reductive moves

Each of these distinctive arguments marshalled against reified notions of Capitalism – in itself, and in music – are insightful. Yet they tend to proceed at a level of great generality. As an example: by dissolving the economy into 'life practices, relations, experiences', Bear et al. miss those heterogeneous but decidedly socio-*economic* and *institutional* (that is enduring, collective) forms – local currencies, cooperatives, credit institutions; in music venues, labels, publishers, distribution networks and so on – highlighted by Gibson-Graham, Stephen Graham and our studies. Capitalism as it is currently theorised is therefore insufficient to encompass all socio-economic activity in the vicinity of music. But it is equally inadequate to focus on individual musicians, their 'life practices' and networks, for the chapters in this book show that music constantly generates forms of collective social life – institutions, organisations, (socio-)economies – that are irreducible to individuals or networks. The fourth plane, in other words, offers a compelling corrective both to 'totalizing theories that attribute to capitalism an intrinsic systematicity or logic', and to arguments for capitalism having 'an endlessly varied, specific, and fractured form' (Appel 2019, 30).

Surprisingly, much of the existing work on capitalism, in general and in relation to music, also overlooks the significance of policies in shaping the 'diverse economy'. As will become clear, this is the second anti-teleological, anti-totalising revision to existing accounts of the political economy of digital music undertaken by this book. For, as Hannah Appel insists, revealing the 'teeming social "beneath" the ostensibly economic' is not enough since it fails to convey how the 'formalizations' of policy 'come to have [generative] effects in the world' (Appel 2015, 2–3). Indeed, the fourth plane illuminates how music's political economy is emergent from 'teeming' social but also economic and political – and specifically policy – activity. The MusDig ethnographies demonstrate, in short, that as an assemblage music encompasses diverse institutional, organisational and political-economic initiatives, and that not all such initiatives should be seen as symptomatic of an encompassing Capitalism.

A virtue of the comparative approach crafted by MusDig is therefore how it renders visible what has been obscured. For our fieldwork made evident the extent to which the music practices we were researching were entangled in, or had generated, an extraordinary array of types and scales of institutions – labels, studios, production houses, distributors, collectives, venues, festivals, online music and social media platforms,

universities, arts councils, copyright bodies, culture ministries, creative industries departments – always in their specific organisational manifestations. It is as though the complexity of the musical division of labour and labour process, along with the plural forms of music's worldly existence, together engender social elaborations of musical practice. And this is likely to be compounded by the ways in which, as the chapters attest, digital technologies appear to fuel an enlargement of the populations of those not only making and consuming music but creating roles as intermediaries. Such social elaborations have many guises: the genesis of an archive, a cultural organisation, a regular night or non-licensed gathering, a project, a studio, a production house, an ensemble, an online platform or an inter-university research consortium. Everywhere, that is to say, we found incessant, humming, at-times-inventive social mediations of this kind – always built around musical sounds, yet with such sounds often shadowed or preceded by additional social, cultural, economic or political purposes.

Cutting our research another way, by digging down into any one ethnography, reveals in each case a singular nexus of institutions and organisations. As one example, in Deo's study of North Indian digital folk music archives such a nexus takes in: a series of audiovisual archives devoted to cultural heritage at national and regional scales including the national Academy for Performing Arts, the Sangeet Natak Akademi (SNA), regional SNAs, and seven Zonal Cultural Centers, all overseen by the Ministry of Culture; the role of national public radio and television, Doordarshan, in disseminating Indian cultural heritage; policies and patronage provided by the Ford Foundation and other philanthropic agencies including the Prince Claus Fund, Charles Wallace Trust, India Foundation for the Arts, and Tata Trusts; and the music archives themselves – the ARCE in New Delhi, Kabir Project in Bangalore, Rupayan in Jodhpur, Lokayan in Bikaner, Travelling Archives in Kolkata, and Adivasi Academy in Gujarat – each, as Deo shows, making particular interventions. To take another example, Valiquet's research on Montreal's academic and nonacademic electroacoustic music scenes charts a quite different nexus of institutional actors, among them: the national and provincial arts councils Canada Council and Conseil des Arts et des Lettres du Québec; cultural policy forums like Culture Montréal; professional societies Canadian League of Composers and Canadian Electroacoustic Community; academic electroacoustic studios and teaching programmes at Université de Montréal, Université du Québec à Montréal, Concordia and McGill; the Concordia- and UQAM-based arts and technology consortium Hexagram; local arts and technology organisations Société

des Arts Technologiques and Association pour la Création et la Recherche Électroacoustique du Québec; labels of different size and orientation including empreintes DIGITALes, Alien8, Ninja Tune and Fluorescent Friends; venues, from the illegal Death Church, informal La Tour Prisme and tiny Cagibi to the established Casa Del Popolo and Usine C; artist-run centres Perte de Signal and Studio XX, hacker space Foulab, and digital gallery Eastern Bloc; festivals Pop Montreal, MUTEK, Elektra and Suoni per il Popolo; and short-lived performance events like 24 Gauche, Finite State Machine and the unlicensed WOMB.

In sum, the fourth plane names an institutional heterotopia that is masked by a focus on Capitalism, one comprised of institutions and organisations mediating musical sound of vastly varied function, magnitude, duration and kinds and degrees of (in)formality, (il)legality and inventiveness. It shows how myriad socio-economies are being patched together, bottom up and top down: social means of living a musical life, musical means of living a social life. And it suggests that the existence of music-mediating institutions and organisations matters in itself, albeit that they function to enable musical experience: for they are *another* – not the only, and not necessarily the primary – object and source of imagination, identification, labour and care constituting music as an assemblage. Our work therefore poses a challenge to (digital) anthropology and (digital) music studies: after MusDig and Gibson-Graham, is it possible to overlook, and not to theorise, the mediating role of institutions and organisations?

Comparisons on the fourth plane: charting differences in industries, institutions and policies

Returning to the MusDig studies, a series of comparative fourth plane findings become visible in this new light. A first major finding concerns the striking contrast between Kenya (chapter 2) and Argentina (chapter 3) with respect to how conditions in the South bear on the growth of digital popular music economies. For as the chapters show – putting paid to any simple technological determinism – despite the influx from the mid-1990s of similar digital means of music production and distribution, the two countries fared quite differently (Baker and Eisenberg 2013). Kenya saw the energetic take-off of a 'born-digital' music industry, whereas in Argentina a series of obstructions blocked the growth of a sustainable digital music economy. The key variables responsible for this remarkable difference appear to be the relative absence or dominance of multinational record companies and their relationship to each country's

copyright institutions. In Kenya, factors including economic downturn in the 1970s and the cassette piracy crisis of the 1980s meant that EMI, CBS and Polygram, which had invested heavily in studios and plants, closed their operations in the 1980s. This left a space in which, given accelerating liberalisation of media and telecommunications over the 1990s and a huge unmet 'youth' music market, a digital music industry could emerge in tandem with new TRIPS-oriented copyright bodies (Perullo and Eisenberg 2015).[17]

In contrast, in Argentina, following industry concentration in the neoliberal 1990s, the multinationals held around 90 per cent of the music market in the 2000s, exerting great influence on government, television and radio and the unreformed copyright institutions. The power of this sclerotic institutional bloc, compounded by the persistence of an anticommercial 'rock' ideology among musicians, weighed against the emergence of an independent digital music industry. In both countries politics played a critical role. Kenya's pursuit of neoliberal economic policies under Presidents Moi and Kibaki encouraged the synergistic growth of the new digital telecommunications and music industries. In marked contrast, after the Argentine economic crisis of 2001, the Kirchner governments took a broadly anti-neoliberal stance, enacting a 2012 Music Law giving state support to the independent music sector – policies that were, however, effectively annulled by the torque set up with the longstanding institutional bloc. In effect, Argentina has been subject to the production of 'economic backwardness' through an expropriative musical capitalism from the North (cf. Gerschenkron 1966). What the comparison shows is that even if we restrict the analysis to musical capitalism, digital developments in the South are far from uniform and have their own '*sui generis* logic rather than [being] a mutation' of a Northern model (De Beukelaer and Eisenberg 2020, 207). At the same time, these findings demonstrate the importance of an anthropological comparativism of political economies both across and between the South and North.

A second major comparative finding expands on the significance of policy: for in every research site, in the South and North, we encountered manifestations of creative industries or creative economy policies – 'formalizations' (Appel 2015, 2) diffused globally through a Tardeian 'imitation as circulation or contagion' (Born 2010c 237) that aimed performatively to bring into being the very socio-economies they describe (Born 2007).[18] Here, our findings highlight both the global formatting and mobility of these policies and the economic theories they enshrine, pointing to two main policy lineages, and the rhizomic map etched by the

policies' variant pathways as they are 'converted' (Appel 2015: 1; Bear et al. 2015) and take seed in local conditions.

The first policy lineage stems from the UK. If the New Labour government of 1997 is credited with initiating creative industries policies, their origins lie in the Thatcher period with London's leftist city government, the Greater London Council. In the early 1980s the GLC developed new thinking on culture and the arts as vehicles for social and economic development, building on experiments in Northern British cities – Liverpool, Manchester and Sheffield – in which devastating deindustrialisation had been met by strategies that gave culture, including popular music, a leading role in stimulating economic growth and urban regeneration (Flew 2011, 15–16). These currents fed a new paradigm espousing the 'culturalisation' of the economy and the value of SMEs (Lash and Urry 1994; du Gay and Pryke 2002). Transposing these experiments from Britain's northern cosmopolitan 'margins', and influenced by the work of Stuart Hall and Nicholas Garnham, the GLC developed two policy directions: 'promotion of ethnic and community arts to empower under-represented minorities in the cultural sphere'; and a Cultural Industries Strategy led by the Greater London Enterprise Board (GLEB) 'to promote new enterprises and more effective public sector intervention in commercial cultural industries' (Flew 2011, 16; Bianchini 1987). The GLC policies were therefore politically ambiguous, protending both leftist and neoliberal futures. It was Garnham's industrial strategy that evolved into New Labour policies, set out in the Department of Culture, Media and Sport's *Creative Industries Mapping Documents* (1998, 2001), which coined the 'creative industries' and portrayed them as a large and growing sector of the UK economy that had 'moved from the fringes to the mainstream', the future of which lay in 'creative' engagements with digital technologies (DCMS 2001, 3).[19] The DCMS *Mapping Documents* became 'a successful British export' and were formative in 'establishing an international policy discourse' on creative industries (Flew 2011, 10–11).[20]

The second policy lineage took the form of a 'cultural turn' in development theories from the late 1990s on. Drawing on influential writers,[21] UNESCO, UNCTAD (United Nations Conference on Trade and Development) and other global development agencies became increasingly interested in culture's capacity to foster sustainable development and respect for human rights.[22] Amartya Sen, in a 2001 speech to the World Bank, portrayed culture as not just a means but an end in development, if by development is understood 'an enhancement of [people's] freedom and well-being' (Sen 2001, 17). In 2011 the cultural turn was ratified by a memorandum of understanding between UNESCO and the World Bank;

henceforth the two would work together 'on urban development for cultural heritage and the economics of culture [as well as] cultural diversity and social inclusion'.[23] Culture had therefore been 'discovered' by 'the very managers of global resources', and 'everyday aesthetic practices' had become 'an inexhaustible kindling for new industries dependent on intellectual property … mobilized as resources in tourism and in the promotion of the heritage industries' (Yúdice 2003, 2–4).

By 2008 the two lineages had converged, with creative industries policies being touted as means of economic development in the South. A key text edited by officers associated with UNCTAD's Creative Economy Programme argued that 'culture and creativity – in modern tradable forms – are increasingly being valued as an economic activity' in developing countries, acting as a 'portal into the global knowledge economy' (Barrowclough and Kozul-Wright 2008, 3, 6). Liberalisation and globalisation should therefore be accompanied by expanding recognition of intellectual property rights, 'whose purpose is to transform intangible ideas into monies' (2008, 22). Citing the British DCMS *Mapping Documents* and Richard Florida's influential theory of the 'creative class' (Florida 2002), the book announced 'a united "voice" for creative industries … at the international level, led by UNCTAD, the UNDP, ITC, ILO, EU, World Bank, UNESCO and WIPO' (Barrowclough and Kozul-Wright 2008, 31). Music was again emblematic, with a chapter on Senegal criticising the lack of a 'coordinated policy for music' and proposing 'a regularisation of intellectual property rights' (Pratt 2008, 133, 142).

The rhizomic map: variant pathways of creative industries policies in the South …

In our research in the South, three variant pathways of creative industries policies became tangible. In each case the policies acted as generative, scale-crossing devices (Callon et al. 2007), propagating and mediating new institutions, new metrics and modes of calculation, new discourses and subjectivities. That academic writers exporting creative industries policies to the South do so without taking stock of these serial changes and their ambiguous effects is a situation with which our work takes issue. In Kenya and India, from the 1990s through the 2000s, paralleled by the growth of digital production technologies and mobile phone distribution, international development and charity funding was increasingly channelled to music and the performing arts, producing a 'cultural economy' shaped by aid and the NGO sector. 'In an age of inexpensive digital media

production and the internet, music-oriented projects generate emotionally impactful products ... [Music therefore provides] fertile ground for development projects oriented towards fostering entrepreneurial activity and creating jobs' (Deo and Eisenberg 2013, 3).

As Eisenberg relates in chapter 2, in Nairobi the work of Ketebul, a production house developing the new Afro-fusion genre, thrived on the patronage of a host of transnational charities and corporate sponsors espousing creative industries and cultural heritage policies, prominent among them the Ford Foundation, Alliance Française and Total Oil. They funded Ketebul in part with the aim of cultivating Kenyan equivalents of global 'world music' stars like Youssou N'Dour or Salif Keita. But a closer audience envisaged by the sponsors was the burgeoning Kenyan middle-class based on the notion that Afro-fusion could fuel a rising national consciousness that might assuage ethnic divisions. One Ketebul project was funded by the EU's Non-State Actors Support Programme, which had among its core missions support for 'cultural expressions of national identity and social justice, particularly initiatives that cultivate a sense of national belonging while fostering positive ethnic and cultural identity' (NSASP 2010, 5). Crossing scales, such policies were visible on the ground in training events that attempted to subjectify musicians as rights-holding entrepreneurs. A 2011 workshop, 'How To Make A Living From Music', was deeply mediated by the British policy lineage; it was led by Kenyan producer R-Kay Kamanzi and DJ David Muriithi, a key figure in the Kenyan 1990s youth music scene later employed by the British Council's Creative Enterprise Project, which funded the event. Muriithi's credentials loop back to being a DJ and band manager in Manchester in the 1980s, a city emblematic of GLEB cultural industries strategies. The main speaker was David Stopps, British talent manager and ambassador for the introduction of a World Intellectual Property Organization (WIPO) regime in Kenya. Representatives from the fledgling Kenyan copyright collection societies spoke of the transparency and accountability of the digital systems being introduced to monitor radio airplay, and panels on copyright, managing a career and monetising music through mobile phone commerce, syncs, branding and so on were enthusiastically received.

North India, Deo shows in chapter 4, took a different path. Here, key agents of the cultural turn in development were Ford Foundation policies promoting the documentation of 'living' folk cultures to showcase India's 'diversity and pluralism', which, along with other NGOs and charities, funded several of the digital archiving projects she portrays. At the same time, digital archiving responded to UNESCO's 2003 redefinition of intangible cultural heritage as inhering not in cultural or musical objects

but in the communities of practice from which they derive – a policy enshrined in the ARCE's Archives and Community Partnership project. In some cases, the digital archives were seen additionally as means of building commercially exploitable 'media assets', and Deo charts the ensuing ontological transformations: on the basis of folk music's recording and circulation, 'decisions about which musics may be disembedded, abstracted and resignified … invariably enact epistemologies of purification [Ochoa Gautier 2006], discursively and sonically isolating vernacular musics from other aspects of lived sociality' (p. 148). The ironic result is a 'heritage economy' that elevates 'heritage [over] the pre-heritage culture (cultural practices prior to them being designated heritage) that it is intended to safeguard', preserving 'in the museum what [has been] wiped out in the community' (Kirshenblatt-Gimblett 2004, 61).

A more overt and politicised policy debate characterised Argentina in the Kirchner era, as Baker shows in chapter 3: an opposition between leftist *cultural* industries and rightist *creative* industries policy discourses, championed respectively by two agencies – the National Office of Cultural Industries (NOCI), part of the Ministry of Culture, and the Office of Creative Industries and Foreign Trade (OCIFT), a department of Buenos Aires' then neoliberal city government. Creative industries policies were thought to have diffused from the UK to Colombia through the mediation of the British Council, and thence to OCIFT. In turn, NOCI's 'post-neoliberal' cultural industries discourse embodied the national government's left–Latin American turn, emulating Brazil's progressive public policies for digital culture as they were given flesh in schemes like Puntos de Cultura, which aimed to decentralise access to free computers loaded with a locally designed, non-commercial operating system (Baker 2013). Baker shows how NOCI oversaw an outpouring of democratic, decentralised policy visions for digital culture, including several aimed at music, impelled by a frank rejection of free-market economics and of the influence exerted by UK creative industries policies in Colombia and elsewhere. Yet few of NOCI's visions were realised, and, strikingly, despite the two agencies' differences over the primacy of social and economic development, they shared a focus on cultivating SMEs and on the productive role of the state.

… And in the North

In the North, the mediation of the digital art music scenes we researched by creative industries policies, inside and outside the universities, was pervasive. In the UK, as I detail in chapter 8, they were tangled up with a

raft of reformist neoliberal policies visited on the university sector since the 1990s associated with the idea of a 'knowledge economy', the promotion of entrepreneurial skills, and the imposition of economistic policies on the arts and humanities. The arts, redesignated creative industries, were henceforth expected to employ digital technologies to generate intellectual property and build partnerships with industry. Today, a core focus of the British Arts and Humanities Research Council is Creative Economy Research, including a Creative Industries Cluster Programme intended 'to create jobs and drive the creation of companies, products and experiences that can be marketed around the world, significantly contributing to UK economic growth both regionally and nationally'.[24] Such policy discourses were heavily in evidence throughout the 2010s, as I convey, just one of a series of intertwined trajectories accounting for the rapid growth of the academic music technology centres and degrees at the heart of my ethnography. Through case studies of four universities responsive to these policies in distinctive circumstances, I chart the different types of scale-crossing invention manifest in the genesis at once of new research institutions, buildings and degree programmes alongside novel modes of interdisciplinary, entrepreneurial subjectivity and new musical practices, politics and sounds.

Yet another variant of creative industries policies has flourished since the 2000s in Montreal, influenced in part by Richard Florida's vision of 'creativity' as a driver of economic prosperity (Florida 2002). The idea gained exposure via a key intermediary: Simon Brault, former Director General of the National Theatre School of Canada, founder in 2002 of the influential urban lobbying organisation Culture Montréal, and since 2014 Director and CEO of the national Canada Council for the Arts. Through Brault's and Culture Montréal's interest in the role of cultural organisations in urban regeneration, he and the group had considerable influence on city arts policies, achieved partly by engineering 'a convergence between the politicised and complex notion of "culture" [prevailing in Quebec] … and the recent notion of "creative industries"' (Valiquet 2014, 5). In chapter 7, Valiquet shows how the particular discourse on 'culture' characterising political, artistic and intellectual life in Montreal has historical roots in the equation of Quebecois modernity with 'the cultural promise of technological progress' (p. 268), as this is paralleled by an enduring humanist commitment to the significance of autonomous linguistic and cultural expression as a 'foundation of society' (Valiquet 2014, 4) – the bedrock of Quebec nationalist and postcolonial identity politics. Hence, in the wake of deindustrialisation, 'funding designed to preserve the city's unique cultural status flows from all levels of

government' (p. 268). With Montreal's concentration of universities favouring high-skill sectors, government funding since 2000 has seen the 'digital revolution' and specifically the city's multimedia industries as engines of economic growth – a discourse recapitulated in digital arts policies promoted by the Quebec arts council CALQ, the consequences of which for Montreal's music scenes are anatomised by Valiquet.

Creative industries policies therefore epitomise mobile 'formalizations'; they are place- and scale-spanning mediators that engender, through mimesis in local conditions, variant institutions, metrics, discourses, subjectivities and sounds, demonstrating that 'every invention … is only a combination of imitations' (Tarde 1969 [1898], 153; Born 2010c). Revising the existing political economy of digital music, our findings again issue challenges: after MusDig, can (digital) anthropology and (digital) music studies ignore the pervasive place of policies in mediating musical assemblages in both the South and North? And does the STS focus on the performativity of economic theories, by 'bifurcating' economics from politics, miss how such theories are enacted, travel and replicate as policies – policies that may bear governmental force but vary in how they bring about their effects?[25]

Hybridising the enterprising university: Northern public-private institutional ecologies

Two last comparative observations complete the revisions to the political economy of digital music developed thus far. The first pursues the previous section, moving in closer on the transformations of Northern universities incentivised by creative industries and knowledge economy policies as they stimulate widespread experimentation in response to the mandate for universities and individual researchers to build entrepreneurial alliances with industry. Although these developments were underway in all our Northern field sites – academic music/arts and technology centres in the UK (chapter 8), Montreal (chapter 7) and UC Berkeley (chapter 6) – it is once more the policies' differential mediation of and by each location, and the singularity of their effects, that is striking.

In the UK such industry alliances are palpable if relatively incipient. At the leading British centre, the Sonic Arts Research Centre, Queen's University Belfast, as I outline in chapter 8, researchers were active in gaining research grants, as well as involved in occasional startups, business partnerships and patents and, via links to government arts and trade and enterprise departments, in proposing a 'creativity hub' to act as a bridge between SMEs and the university. More indicative of the strong,

field-transforming effects of such policies is the mould-creating Centre for Digital Music (C4DM), Queen Mary, University of London, 'a world-leading multidisciplinary research group in the field of Music and Audio Technology'.[26] With foundations in engineering, and lacking capacity in other areas of music education and research, C4DM is highly successful in generating patents, software and data resources as well as in grant capture from bodies like Innovate UK, the AHRC Knowledge Exchange Hub for the Creative Economy, the Engineering and Physical Sciences Research Council, and EU Horizon 2020, with partners including the Alan Turing Institute, the Yamaha Corporation and the BBC.

Our Montreal research shows a fuller flourishing of this paradigm. In Montreal, the beacon of university enterprise of this sort is the Hexagram consortium. Far from being the biggest Canadian initiative of its kind,[27] Hexagram was created in 2002 as a large interdisciplinary arts and technology centre spanning Concordia University and University of Québec at Montréal (UQAM). It was funded by a CAD $22 million federal grant from the Canada Foundation for Innovation (CFI) and CAD $6 million from Valorisation-Recherche Québec (VRQ), the first artistic research initiative in Canada to be funded at such scale by national and provincial knowledge transfer agencies (Fourmentraux 2010, 140). As a key figure in the grant application recalled, their words echoing the serendipitous discovery of an entrepreneurial self expressed by equivalent figures in the UK (chapter 8, pp. 321–3): 'the Dean asked me … to write this grant. Once the two universities knew there was a shotgun marriage going on at this level, we called a huge meeting to say: "whoever is doing digital work, … come to the meeting!" … [It was] a motley crew of people from Concordia and UQAM, and based on that I basically conceptualised possible domains, and persuaded [people who could be leaders] to give me some material and … I just made it up! I just invented it.'[28] Hexagram has since partnered numerous IT, multimedia and entertainment firms, among them video game company Ubisoft, new media/entertainment studio Moment Factory, multimedia design and production companies GSM Project and Pixmob, and Softimage, then a firm producing 3D animation software connected to Hexagram via the Daniel Langlois Foundation with additional partners Cirque du Soleil and Gillett Entertainment Group. Knowledge transfer largesse was provided by not only CFI and VRQ but the private Consortium en Innovation Numérique du Québec (CINQ), itself funded partially by Quebec's Ministry of Economic Development, Innovation and Exports (Payne 2014).

A third variant of this hybrid institutional ecology enmeshed the Center for New Music and Audio Technologies (CNMAT) at UC Berkeley

and, as Snape and I relate in chapter 6, it is implicated in the evolution of the Max software. CNMAT's Max researchers consider that they enjoy a certain autonomy, crafting technologies that enhance Max as a proprietary environment and gifting these publicly-funded fruits through their release into the music-tech public sphere. The Center is nonetheless subject to the publicly-funded university's research management, notably its office of Intellectual Property and Industry Research Alliances, charged with connecting research to commerce so as to '[enhance] the university's research enterprise' and act as an 'economic driver for the Bay Area and State of California' (p. 257). We analyse CNMAT's entanglement in a three-way symbiosis with Max's developer, the company Cycling '74, and the German company Ableton – responsible for the DAW Ableton Live – which acquired Cycling '74 in 2017. Where relations between Cycling and Ableton forge a commercial alliance, in the relations between CNMAT and Cycling, it is the public CNMAT that adds value to Cycling products. The flow of the realisation of monetary value is therefore from CNMAT to Cycling and from Cycling to Ableton – from public university to (formerly independent) company, and thence to a corporation with annual revenues of USD $60 million.[29] Effectively, the public university bleeds value into music-tech capital. This institutional ecology, we contend, with its permeable membrane between academia and industry and one-way value transfers, is a marked feature of the political economy of digital music – yet it appears to escape notice. It is, moreover, the same ecology that nourishes the burgeoning academic-industry partnerships driving research on Artificial Intelligence and music, evident in the lively music-AI startup sector (Dredge 2018), its firms often founded by PhD students leaving academia.

For a political economy of the internet – as it mediates and is mediated by music

A final comparative observation concerning the fourth plane, and the political economy of digital music, takes its cue from two chapters featuring the internet as the locus of creative musico-technical practice: our analysis of Jekyll, the extralegal file-sharing site, in its interdependence with Spotify, its legal-corporate 'other' (chapter 5); and our portrait of the intermedial intertextuality animating internet-mediated genres – how, for example, the vaporwave subculture engages in parodic online play with earlier internet-based content, media and formats (chapter 9). Chapter 5 diagnoses Spotify's union of two tendencies: a circulation-based capitalism and a rentier musical capitalism. Yet ultimately not only

these tendencies, and the frenetic online activity associated with Jekyll and internet-mediated music genres, but the vast majority of practices addressed ethnographically in this book depend upon the internet as an infrastructure – and one that is incessantly churning. The pervasion of the internet as infrastructure is, then, a 'missing signifier' – 'what resists thought within thought itself' (McGowan 2008, 58–9) – running through this book, as well as much scholarship in digital anthropology. Rather than tame this problem by naming it 'platform capitalism' (Srnicek 2017), MusDig suggests that what has to be reckoned with conceptually is the complexity of the mutual mediation between the political economy of music and the political economy of the internet. This is surely only the latest, most spectacular phase in a history of intersectoral interpenetrations between the music industries and the consumer electronics, telecommunications and IT industries – where the decisive shift in the last two decades has been 'from CE to IT as the most powerful sectoral force shaping how music and culture are mediated and experienced' (Hesmondhalgh and Meier 2018, 2).

The internet is, then, a macro-mediator of many of the musical, social, political and economic developments portrayed in the MusDig research – just as music has been formative, a crucial mediator, in the evolution of the internet. Yet because of its complexity, the internet itself tends to be glossed over in analyses of the political economy of digital music – and pushes to the limit the injunction to cross scales in analysing music's mediation. What is required is something akin to Kate Crawford and Vladan Joler's astonishing 'anatomy of an AI system' which, focused on the Amazon 'Echo' voice-activated assistant, traces out from its domestic functioning how 'each small moment of convenience … requires a vast planetary network, fuelled by the extraction of non-renewable materials, labor, and data', a network 'through which materials, components and products flow' (Crawford and Joler 2018, 3, 10), while 'beneath these connections lie many more layers of fractal supply chains, and forms of exploitation of human and natural resources, concentrations of corporate and geopolitical power, and continual energy consumption' (2018, 5). The need for a political economy of the internet, in itself and as it mediates music, has never been more urgent – and is the limit of what we have accomplished in MusDig.[30]

To conclude this section: the fourth plane of social mediation indicates the explanatory gains of an anti-reductive conceptual framework, 'a new set of transversal categories and forms of thought that elude both dualism and determinism' (Butler and Athanasiou 2013, 43) – and one which, extending Gibson-Graham, overcomes the putative

separation of the social and economic in music. The result is a framework that both recognises and valorises the manifold institutional forms – an institutional heterotopia – participating in music as an assemblage, as such myriad social formations may in turn be mediated by policies, and as together they fill out what is a radically reconceptualised political economy of digital music. This is a political economy in which those profuse social formations – neglected by previous political economies and by approaches focused purely on musical practice – not only become visible comparatively but are acknowledged to matter in themselves, as living incarnations of music's 'diverse [socio-]economy'. At the same time, comparison has brought out the remarkable significance of transnational political and institutional forms in the guise of creative industries and cultural heritage policies promoted by governments, NGOs, development agencies and charities. Such policies act as instruments of soft foreign policy intended to format music economies by reorganising the boundaries between non-market and market, non-commodified and commodified musics (cf. Mitchell 2002), sometimes with violent ontological consequences for musicians and their lifeworlds (chapter 4). Yet for all the performative force and global 'identity' of neoliberal policies, comparison on the fourth plane makes palpable the differentiation and the singularity of their planetary trajectories and effects. The fourth plane revises previous political economies, in short, by demanding that both the travelling 'formalizations' of policy and the heterogeneity and autonomy of institutions be taken into account – without the former entirely determining or subsuming the latter.

Illuminating four planes of social mediation of music, towards politics – in the South …

At this point it is possible to return to the larger framework and fill out comparatively how all four planes of social mediation of music are manifest in our studies. In parallel, what follows develops the insight that each of the four planes can act as a host for the cultivation of a diversity of politics.

To begin in the South: in Kenya, Eisenberg conveys in chapter 2, the conditions described earlier have engendered 'aesthetic entrepreneurship' among digital popular musicians, a combined experimentation with creating new sounds and new business organisations. In fact, his interlocutors were engaged in experimenting simultaneously with all four planes, always through the mediation of musical sounds. They were intent on building studios, labels and production houses as viable

enterprises (fourth plane), while their musical practices responded to the advent of DAWs by ushering in new studio socialities centred on the 'creative producer' – a new musical division of labour (first plane) (chapter 2, p. 53). These ambitions were interlaced with yet others: to develop new genres and, through the music's affective powers, enliven new musically-imagined communities (second plane) which, by reshaping existing boundaries between groups divided by ethnic, generational and rural-urban differences (third plane), might also bring into being new social coalitions in the form of audiences. Each of these 'four plane' aspirations had a certain autonomy; musicians' entrepreneurial success did not determine but depended on musical success, yet building a small business was itself an autonomous project. But the lynchpin was the search for original sounds demanded by the creation of a new genre, sounds that would potentialise both new 'aggregations of the affected', of those captivated by the sounds (second plane), and a reconfiguration of the demographic makeup of audiences (third plane): a cascade of non-linear effects made possible by the emergence of a new genre (Brackett 2005; Born 2011, 383–4). Indeed, it is by analysing genre as a contingent 'point of convergence ... between aesthetic figure, musically-imagined community and wider identity formation that ... we can grasp the way that wider social identity formations are refracted in music, and that musical genres entangle themselves in evolving social formations', a process 'oriented to the production of teleology and thus the erasure of its own contingency' (Born 2011, 384). Certainly, these ambitions were prominent in the work of Ogopa Deejays and Ketebul, two fourth-plane initiatives (a label and a production house) discussed by Eisenberg, both of which developed novel genres through musical experiments driven by a conviction that Kenyan urban popular music had not yet sufficiently incorporated vernacular sounds and those of marginalised Kenyan groups, and both of which envisaged such aesthetic moves as means of assembling new audience coalitions. Moreover, pronounced political projects were immanent in these developments: an affective-and-social politics – generated by synergies between the second and third planes – oriented to crafting sounds that might draw those new audience coalitions into passionate association; and an 'urgent *decolonial*' politics, fomented by synergies between the first and third planes, enacted in creative collaborations with musicians from marginalised communities as a means to engage with and potentially reshape Kenyan social 'differences and inequities' (p. 76).

In India, other assemblages come into view. Transnational patronage, as Deo shows in chapter 4, has supported the creation of an

array of (fourth-plane) digital folk music archiving organisations. Yet telling contrasts can be drawn between the Lokayan-Kabir Project and the Adivasi Academy. The Lokayan-Kabir Project, run by local high-caste males and visiting intellectuals and activists, was engaged in recording elderly, low-caste female folk singers. These pronounced (third plane) social differences mediated (first plane) recording studio socialities, so that 'the recording studio emerged ... as a space of negotiation over musical sounds and technical practices between those with unequal social status and power' (p. 160). To these tensions were added (second-plane) differences over the interpretation of Kabir, the fifteenth-century saint whose poetry inspired local folk traditions. The Kabir Project sought to use local folk music to affectively mobilise populations for a national politics of secular pluralism. Whereas for local low-caste adherents, Kabir-based folk traditions enlivened a musically-imagined community bound to a quite different affective politics, unifying them in common resistance to caste-based inequalities and injuries. There was, then, an attempted overwriting of Kabir's local meanings by the archivists, and an ontological violence in the way recording was being used to abstract the music and lift it into global circulation – an overwriting enabled by how (third-plane) social relations of caste, class and gender got into both the (first-plane) socialities of recording and (fourth-plane) organisational forms, cross-plane interferences mediating the very sounds put into digital circulation. In marked contrast, the Vaacha archive at the Adivasi Academy is a (fourth-plane) organisation founded on principles of tribal self-representation allied to a (third-plane) social movement among indigenous people aiming to mitigate the inequalities and injustices to which they are subject. These goals have stimulated (first-plane) participatory, self-representational recording and archiving practices; and the whole assemblage is affectively catalysed by the (second-plane) musically-imagined community aroused by Adivasi music, linked as it is to a politics of indigenous self-determination. The comparative heuristic of four planes reveals starkly not only how variably differences of social power imbue such Southern music assemblages, but how similar (fourth-plane) patronage *underdetermines* both the nature of the assemblages and the politics they channel. If the Lokayan-Kabir Project shows how music's social mediations can magnify inequalities, Vaacha makes clear how digital archiving can be enrolled in projects in which all four planes synergistically propel the transformation of inequalities. In both cases, the social mediations get into the very musical sounds; and in both, folk music's capacity to incite musically-imagined community foments macro-political affiliations.

… And in the North

Coming to the North, our ethnographies reveal quite different comparative configurations. In Montreal, the UK and Europe, the academic digital art music and music technology scenes we researched had a unified (third-plane) social profile, predominantly male and white, their whiteness 'unmarked' (Dyer 1997; Frankenberg 1993) – a profile reproducing those of both art music composition and engineering as professions (Born and Devine 2015; Born 2020). If a (third-plane) politics of gender was emerging, it was at an early stage.[31] Also common was their (fourth-plane) location in universities that, responding to neoliberal policies, had engaged as we have seen in strenuous restructurings under the signs of creative industries, interdisciplinarity, knowledge transfer and so on. These universities host electroacoustic music studios, music technology research centres and degree programmes the academic authority and subsidy of which has for decades sustained electroacoustic art music as a hegemonic lineage, legitimising the considerable public investment on which it depends. Yet in Montreal, Patrick Valiquet's work shows, academic electroacoustic music has been paralleled by the growth of nonacademic noise and sound art scenes comprising those who stand aesthetically and ideologically opposed to, excluded or self-excluding from, academic music. These scenes coagulate as a '"permanent bohemia" produced by the city's long standing community of students, artists and musicians' (Valiquet 2013, 3, citing Stahl 2001), a bohemia defined 'relationally … [by] a logic of differentiation' which establishes its 'own cultural and moral economy' (Stahl 2001, 102). A distinct fourth-plane inventiveness characterises the noise and sound art scenes, manifest in a flourishing of alternative organisations – micro-labels, collectives, unlicensed venues – and socio-economies, among them non-commercial modes of 'restricted circulation' and barter, as when 'a face to face network of producers and connoisseurs … share the ability to participate directly in listening, trading and gifting' (Valiquet 2013, 4). A politics addressed to (un)employment, labour, precarity and the commodity form infuses this fourth-plane experimentation, in exuberant synergy with the scenes' material politics (pp. 447–50).

It is, however, the first plane of social mediation – the socialities engendered by performance events as they enact particular musical divisions of labour – that is the main locus of experimentation within academic digital art music, as explored in chapter 8. Through a spate of departures from the ontology of acousmatic modernism and, more generally, Western art music (WAM), these practices enact variants of

a politics of ontology. Animating the first-plane experiments are the embrace of improvisation, participation and posthuman and environmental currents as counter-practices to WAM's hierarchical human division of labour: the troika of composer, performer and audience (Born 2005, 26–7). They take multiple forms: the 'non-hierarchical network music topologies' of telematic music; 'audible ecosystems' that assemble sounding open feedback systems between nonhuman, human and environment; relational sound events in which 'moving bodies, speakers and room … [coproduce] aesthetic experience and embodied knowledge'; non-hierarchical collective improvisations; sounding participatory experiments among musicians, between musicians and audiences, and between nonhuman and human actants; and instrument-building workshops in which collaborative technical labour transmutes into composing (pp. 345–59). Striking is the extent to which first-plane socialities are reflexively foregrounded in these practices, conceived as a fertile and an autonomous mediation of musical sound through which to enact variants of a politics of ontology. Among the myriad influences retained by such practices – and suggestive of the (second-plane) musically-imagined communities they bring into being – are both musicians (inter alia Tudor, Xenakis, Brün, Neuhaus, Amacher, Young, Cardew, Zorn, MEV, AMM, Throbbing Gristle, Merzbow) and theorists (Whitehead, Freire, Boal, Debord, Maturana and Varela, Gibson, Latour, Fluxus, Bourriaud, Bishop and other exponents of post-conceptual art). It is broadly this mélange of twentieth- and twenty-first-century aesthetic, philosophical and cultural-political currents that is taken to proffer 'an anti-aesthetic to acousmatic music' (p. 358). Yet this is an anti-aesthetic that is entirely compatible both with the (fourth-plane) neoliberal university and with a lack of significant transformation of the (third-plane) constituency of mainly white, male practitioners. In terms of cross-plane interferences, in short: the neoliberal university (fourth plane) makes possible inventive first-plane musico-social experiments, while retaining a specific (third-plane) raced, gendered body of practitioners. In academic digital art music, the action and the politics arise mainly on the first and second planes, against a background of resilient continuities – and the virtual absence of a politics – on the third and fourth planes.

Two counterintuitive comparative findings stand out from these observations. The first turns on politics. On the one hand, in the South, transnational aid-funded creative economy and cultural heritage policies finance both the Lokayan-Kabir Project and the Adivasi Academy, the latter allied to a radical (third-plane) social movement for indigenous cultural and musical self-determination. On the other hand, in the North,

the neoliberal university can readily tolerate a politics focused on ontologies of music, one enacted primarily on the first and second planes of music's social mediation. On the basis of our studies, then, transnational patronage in the South is capable of supporting radical political experiments in music's social mediation, while Northern universities host more circumscribed musico-social experiments in the politics of ontology.

A final remarkable contrast between our studies in the South and North turns on the relationship between genre and audience. It comes to the way that digital popular musicians in Kenya, as we have seen, hone their skills in crafting novel hybrid sounds at the same time as working inventively to assemble new audience coalitions – mining those synergistic interferences between the second and third planes highlighted earlier. In other words, these Kenyan musicians create new sounds not only to inflame (second-plane) collective musical passions, but they do this on occasion with an ear to how such musical moves and the ardour they stir up, by potentially reconfiguring the boundaries of existing (third-plane) social identity formations, can bring about new social coalitions. In contrast, in the UK and Montreal, among many practitioners of digital art and crossover musics, genre is taken not to be a productive force but vexing, a 'perennial problem', even obsolete (Brassier 2007; Valiquet 2018, 96). Yet in the UK, at least, the disavowal of genre appears more honoured in the breach than in the observance. This is evident in the way current practices, commonly assumed to be beyond genre, seem guided by a 'principle of least difference' (Gell 1998, 218), resulting in 'many slightly variant versions that … [remix] given elements to forge new aesthetic, material and conceptual directions often through tiny differentiations between the previous and next musical object or event' (chapter 8, p. 365). Notable too is how these minor variations are guided not by a sense of music's potential to assemble new, as yet unrealised social coalitions as audiences so much as by an involuted orientation towards production for one's peers, encountered in the sequestered halls of international music tech conferences and festivals. Rather than seek a wider public, these practitioners are more intent on finding 'recognition within the peer competitor group' (Bourdieu 1993, 116).

A fifth plane of music's social mediation?: designing music's governmentality online

A concluding twist in this discussion of music's social mediation stems from Blake Durham's ethnography of music's online circulation and consumption (chapter 5) and points to the urgent promise of

conceptualising a fifth plane of social mediation, one specific to online formations. The earlier section 'On material/technological mediation' (pp. 444–55) drew attention to two forms of social mediation of digital-and-otherwise materialities: the status hierarchies enacted in the 'long march' away from concrete commercial technologies among proponents of post-digital aesthetics; and the social stratification manifest in the huge disparities of technological resources both between North and South and between Southern metropolitan institutions and elites and subaltern people and organisations. Durham's comparative ethnography of Spotify and the extralegal music-sharing platform Jekyll brings into focus a very different mode of technological mediation of the social, prompting the observation that the number of planes of music's social mediation is not fixed but in principle open. Through ethnographic analysis of Jekyll's rule-encrusted peer-to-peer technical architecture, designed by early participants, Durham shows that this normative technical scheme is at the same time a social diagram: the design not only of social relations but of an intimate governmental apparatus (Deleuze 1988, 23–44; Foucault 1977, 205; Vellodi 2014).[32] The irony is that this 'governmental topology' has been invented not by a national government or its agencies but by an extralegal file-sharing platform (cf. Ruppert 2012).

Durham's ethnography therefore proffers new conceptual directions in the sociotechnical analysis of the internet. As early as 1998 Steve Jones called on social scientists to abandon any temptation to view the internet as a realm apart from 'real' life and approach it as a 'social medium' in its own right (Jones 1998, x). Such an approach remains auspicious. It transcends the dualisms – virtual/real, online/offline, immaterial/material (Miller and Horst 2012) – that, through a 'derealization of the digital' (Boellstorff 2016, 397), haunt digital anthropology. It brackets the 'naturalism' often imputed to online socialities, inviting examination of how they are 'consolidated' through 'multiple logics' (Marres 2017, 74–6). It also prompts a return to the classic STS debate over whether 'artifacts have politics' (Winner 1980). Langdon Winner's 1980 disquisition on this theme, for all its airing of various permutations of the social mediation of what he called 'inherently political technologies' – whether they require 'the creation ... of a particular set of social conditions' or are merely compatible with them, and whether such conditions are 'internal' or 'external' to a given technical system (Winner 1980, 130–1) – ultimately portrays the social as outside even these technologies. Redressing this tendency, Michel Callon, in an early essay on actor network methodology, takes the entry of the engineering firm Électricité de France (EDF) into the electric car

market in the 1970s as a case study in 'society in the making'. His analysis revolves around 'engineer-sociologists' whom he credits with designing at once the cars' technical systems and 'the social universe in which the vehicle would function' (Callon 1987, 84). The EDF designers achieved this – in remarkably similar ways to the Kenyan musicians described in chapter 2 – by envisaging new markets, 'users who had new demands'; in this way the designers moved seamlessly between 'electro-chemistry [and] political science' (1987, 85–6), effecting a 'coevolution of society and its artifacts' (1987, 97). With theory to the fore, Callon pays less attention to the technical systems at issue. Durham's ethnography makes good this lack, making plain that in the design of online systems like Jekyll, any gap between engineering and sociology collapses.

What Durham's work shows, extending Callon, is that the sociotechnical design of online music platforms – whatever the nature of the (first-plane) socialities and practices arising from engagement with these platforms – constitutes a strong and increasingly prevalent kind of social mediation of musical experience: a social diagram. Indeed, the design of the technical architectures of these platforms is also immanently the design, construction and governance of novel social relations. The fifth plane is, then, distinct from the other four planes; it (again) exhibits a certain autonomy; and yet it is (again) entangled in the other four planes of music's social mediation. Specifically, the fifth plane draws attention to how the internet makes available a vast expanse of powerful media engendering a combined technical-and-social invention that, congealed as diagrams, govern the life of each music platform. Celia Lury's work on social media suggests, however, that the concept can fruitfully be extended to non-music platforms – websites and apps that not only invite participation but strenuously format and organise that participation. Social media – her exemplar is Klout, the influence-ranking platform[33] – trigger practices that are the 'outcome of recursive processes of measurement, which in turn depend on the participation of [users] whose activities are invited and organised by the [platform] itself' (Lury 2017, 2–3). Such platforms therefore introduce 'abstraction into social life by way of media-specific operations'; their rules and metrics 'are not designed to capture a separate reality, but ... to modify the activity' the platform itself has elicited (Gerlitz and Lury 2014, 180, 174), stoking the desire and the capacity 'to evaluate and modify the self' (Lury 2017, 3–4). Indeed, the 'ongoingness' of the platform metrics incites users constantly to rank themselves comparatively in relation to the larger user population. By virtue of the incessantly evolving metrics, Lury argues, *comparison is itself lived 'as a social relation'*

(2017, 4), inculcating in users a continually replenished reflexive consciousness of one's relative position in the rankings, of being 'less good' or 'better', the rankings contributing novel mechanisms to 'the making of social hierarchies' (Gerlitz and Lury 2014, 182).

The case of Jekyll adds to this theorisation a focus on the governmental qualities of these platforms. As Durham details, Jekyll's sociotechnical design implements a system for music's online circulation and consumption that translates the putative liberal freedoms of extralegal P2P exchange into an elaborate architecture of rigorously enforced, rule-bound procedures: a comparative ranking based on behavioural metrics in the guise of the 'user class system'; an endlessly recalculated personal download-upload ratio governing file-sharing reciprocity; a monitoring of acceptable audio formats; and the policing of rule violations along with sanctions against transgressors and the exclusion of those deemed unlikely to comply. In these ways Jekyll and similar platforms translate into music and reify the techniques of governmentality and the forms of subjectification – that is, of the constitution of users' subjectivity – associated with what Nikolas Rose calls 'advanced' liberalism. Hence, in Jekyll's 'regime of the actively responsible self', users are enjoined 'to fulfil themselves within a variety of micro-moral … "communities"', and the platform design answers the 'problem' of creating 'means by which individuals may be made responsible through their individual choices for themselves and those to whom they owe allegiance'. To these ends the platform implants 'particular modes of calculation into agents' along with norms of 'competition [and] quality', governing '"at a distance" through the instrumentalization of a regulated autonomy' (Rose 1996, 56–7), implementing comparison as, precisely, a social relation.

Jekyll's technical design, in short, is immanently the design of certain types of subjectification and social relation. Rather than conceptualise the platform as a 'recursive public' concerned 'with the material and practical maintenance and modification of the very means of its own existence … [and] as a collective independent of other forms of constituted power' (Kelty 2008, 3), Jekyll both mediates other forms of 'constituted [social] power' and adds its own, fifth plane: through its rule-bound technical architecture for music sharing, it translates liberal governmentality online.[34] The platform demonstrates how propitious the internet is as a 'social medium', enabling as it does the engineering of novel forms of sociological imagination. It is on this basis, I propose, that Jekyll (but also Spotify) make it possible to conceptualise a fifth plane of social mediation of music: the platform as social diagram.[35]

Rejoining this analysis to the entanglement in Jekyll of other of the (now) five planes of music's social mediation, it emerges that Jekyll's social diagram was designed by members exhibiting a characteristic (third plane) demographic: mainly Northern white men aged 18–25, having left-libertarian leanings and 'some college education', 'with a long tail ... [including] older (50+) members with connections to Grateful Dead/tape trading communities', and with the site enacting raced exclusions by policing audio quality, proscribing participants from selected countries of the South and, in its early years, banning hip-hop mixtapes.[36] At the same time, it would be easy to overlook the social pleasures of such online formations – how Jekyll's participants gained stimulation and solace from the (first plane) socialities enlivened by their ardent engagement with the platform. And in terms of (second-plane) musically-imagined community, Jekyll brought together not so much those affiliated to particular musical genres as those sharing a passionate, even fetishistic dedication to high-quality audio – devotees, that is, of an aesthetics of the format. It is these insights into the coagulation of common identities, participatory forms of belonging, and aesthetic-ideological mutualities that in some measure explains the intense devotion to the platform and its practices chronicled by Durham.

Reprise: on the political and ontological in music, in the middle of events

The foregoing pages making up the postlude, which draw out comparative findings across the MusDig ethnographies, add a layer of analysis and theorisation to the chapters in this book – but it is just that: another layer. For as readers who read the chapters first will be aware, each chapter contains its own formidable analytical framing. This brings into awareness another experimental principle of the MusDig project: how subtle ethnographic research – as anthropology has long maintained, and as post-positivist empiricism further illuminates – can be interpreted in more than one way, making it possible to work creatively with theory, in principle generating alternative, even contending analyses.

Yet all the MusDig ethnographies embody a founding idea: music decentres the digital – expanding the lens beyond digital technologies to take in music as an assemblage of heterogeneous sonic, corporeal, discursive, visual, spatial, social and material mediations – where none of these are privileged a priori, and where sound itself consists 'all the way down ... of nothing but mediations ... of varying scale: from energetic

waves propagated through the air, to the pinnae and torsos of players and listeners', to the microsocial choreography of an electronic improvising ensemble, to the spaces of a field in Rajasthan packed with folk music enthusiasts or of a high-tech computer music auditorium in Belfast built for 360-degree sound diffusion (Born 2018b, 196).

To do justice to this scale-crossing conception of music as assemblage I invoked the ghost lineage of *Anthropology as Cultural Critique* in the introduction to this book, splicing it with contemporary anthropological, postcolonial and mediation-theoretical perspectives to craft a generous conceptual vessel from which to approach the ethnographies lashed together on the raft of the MusDig programme. Anthropology, I have insisted, should no longer border off the study of music, enclaved in its own subdiscipline. Music should be welcomed not just as equally compelling as other cultural practices that are the focus of anthropological inquiry, but as particularly generative given music's fertility in recasting prevailing conceptual settlements. For similar reasons, I have suggested, studies of digital media and digital political economies might fruitfully place music at the heart of their concerns. Implementing these two programmatic statements, the analyses proffered in the introduction and in this postlude resonate with the growing body of work in anthropological theory and economic anthropology that draws inspiration from the work of Gibson-Graham, including Bear et al. and Appel, reading them through music to modulate and update *ACC*. MusDig responds vigorously, then, to Jocelyne Guilbault's timely call: rather than ask 'of what use to the study of musical practice is social theory', the question is what the study of music contributes to social and anthropological theory (Guilbault 2014, 322).

By exploring the MusDig ethnographies comparatively, this postlude hones a methodology attentive to music's mediations beyond media-centrism, one alert to the differentiation of the musical, the material and the social, cognisant of what is absent or hidden as much as what is explicit or 'observable' (Latour 2005, 53; cf. Born and Barry 2018), and one that performs agile nonlinear analytical operations on and between the aesthetic and social, material and discursive, political and ontological. In this methodological vein the postlude has refigured the political economy of digital music, tracing the transnationally mobile 'formalizations' of policy, tarrying with music's copious institutional mediations – crossing scales and mobilising history with respect to both South and North. It has elaborated how the South and North host an array of technological and material cultures around music, heterogeneous arrangements composed of digital-and-otherwise materialities that in the

South can no longer be captured solely in the Larkinesque terms of breakdown or distortion – arrangements that condense quite different 'meanings' attendant on local aesthetic and material, cultural historical and ontological conditions. It has shown how critical ethnographies of digital music need to be concerned with uncovering inequalities, hierarchies and stratifications of access, infrastructure, knowledge and practice *within* the South and North as well as between the South and North.

The occlusion and compounding effects – tracing the presence and absence of politics across the five planes

A last, unforeseen outcome of the comparative analysis in this postlude is to bring politics into focus, in part through the relationship between politics and the five planes of music's social mediation. In short, the five planes make it possible to think the political – in music, and in general – in original ways. The relationship between music and politics has already begun to be conceived in terms of their mutual mediation and as inherently plural (Born 2013b; Street 2012; Drott 2018; Garrett 2018). A formative insight thrown up by the postlude builds on these foundations: it is that each of the five planes, but also the interferences between them, can become surfaces on which a politics may gestate or be inflamed. Throughout the MusDig studies we encounter varieties of 'molar' politics:[37] the globe-spanning trajectories of digital creative economy and cultural heritage policies associated as they are with national, regional and municipal governments, transnational NGOs and neoliberal universities (fourth plane, chapters 2, 3, 4, 6, 7, 8); the national secular political ambitions of the Kabir Project and the indigenous social movement associated with the Adivasi Academy in India, both of them identity-political projects ignited by collective musical passions (interferences across the third and second planes, chapter 4); and Jekyll's social diagram, a music platform that translates and revivifies 'advanced' liberal governmentality online (fifth plane, chapter 5).

But we also encounter 'molecular' politics, irreducible to such molar entities as governments, policies, political parties or social movements: in the musico-political attempts by Kenyan musicians, labels and production houses to generate novel sounds and genres and thence transformative social coalitions (interferences across the second and third planes, chapter 2); in the prolific coining of alternative music institutions and socio-economies – micro-labels, unlicensed venues, collectives, projects, gifting and barter networks – as they potentialise and support novel

musical practices, emergent genres and, sometimes, new audiences (entanglements across the fourth, second and third planes, chapters 2, 3, 4, 5, 7, 8); in the diverse material politics of 'anti-concrescence' and the post-digital propagated by Northern noise musicians and sound artists as well as in the intermedial online practices of subversive subcultures – a barrage of singular negations of reigning ontologies of technology (chapters 7, 8, 9); and in the guise of several modalities of a politics of ontology evident not only in these material politics but in the novel performance socialities of improvisation, participation, nonhuman-human collaboration, relational sound events and so on as they foster the emergence of new imagined communities of sonic-and-musical practice (interferences across the first and second planes, chapters 7, 8). To be sure, both tendencies – molar and molecular politics – interpenetrate and coexist; yet if both sustain mutations, it is the molecular that incubates transformation not as a function of 'a difference in scale but a difference in kind' (Patton 2000, 43). Indeed, after Tarde, the molecular operates 'according to a type of segmentation irreducible to the molar segmentarity' of, say, class (Deleuze and Guattari 1987b, 254, 249). In MusDig, the intercalations and interdisruptions between the molecular and molar might be glimpsed in how the Northern material politics described, energised in part by neoliberal research policies, has also become an incubator of a (third-plane) gender politics: a productive but limited identity politics increasingly prevalent across the North.[38]

Several qualifications must immediately be made. It goes without saying that the five planes of social mediation will not always foment a politics; and when they do, the politics will not necessarily be progressive – take as examples Jekyll's diagram for liberal governmentality online (fifth plane) or the pervasion of creative economy policies (fourth plane). Taking account of the five planes of social mediation must therefore attend to not only when a politics *has* been incited but when it has *not*, or only weakly. As I suggested earlier, for instance, the emergence of several 'species' of digital art music enacting variants of a politics of ontology (chapter 8) was not accompanied by a (fourth-plane) politics addressed to the neoliberal university, and only weakly by a (third-plane) politics aiming to transform the gendered nature of these scenes. Such unevenness can be conceived as an *occlusion effect*: how a politics on one plane or of one kind can have the effect of occluding, rendering inaudible or less audible, the absence or weak development of a politics on another plane or of another kind.[39] Indeed, the occlusion effect can also manifest on one plane: as when, for example, a (third-plane) politics of gender operates so as to occlude or conceal the absence of a (third-plane) politics that

might have arisen to combat injustices and inequalities associated with caste or class, race or ethnicity as they are emergent from the 'topology of intersectionality' – that 'social reality in which molar differences (sex, race, class) ... cross and disrupt each other' (Saldanha 2010, 5). The occlusion effect is prevalent today in musical politics in the North, which tend to be inflamed on the first and aspects of the third planes of social mediation while being absent or underdeveloped in other respects – neither conceptualised nor enacted, as might be possible, on or across the other (especially the fourth and fifth) planes. Specifically, it is as though a politics of gender is taken metonymically to stand for a politics that engages with other (third-plane) vectors of injustice or disadvantage, as well as other planes – of course, an illusion.[40]

The corollary of the occlusion effect is the *compounding effect* which can occur when a politics arising on several planes of social mediation act in concert, synergistically, to create especially reverberant, decentred and distributed political effects. The strongest example from the MusDig ethnographies is the Adivasi Academy (chapter 4), which enacts a robust, fractal mesh of a politics of indigenous self-determination composed of a (fourth-plane) indigenous institution allied to a (third-plane) indigenous social movement, the two enabling (first-plane) self-representational music recording and archiving practices, as these politics coalesce and affectively bond through the (second-plane) musically-imagined community aroused by Adivasi music. A very different, contradictory case of the compounding effect is how UK digital art music scenes (chapter 8) have been mediated by neoliberal policies that transform the political economy of universities and the music research initiatives they support (fourth plane), a situation that has unleashed a welter of more-or-less inventive and politicised experiments in the practices and aesthetics of (post-)digital music (first and second planes), while leaving largely unchanged practitioners' predominantly white, male demographic profile (third plane). It is the shape of the decentred musico-political assemblage produced by the interweaving of the presence and absence of politics across the five planes of music's social mediation that is captured and made visible by the occlusion and compounding effects.

These findings both affirm and unsettle current theories of politics and art. Certainly, it would be a mistake to reduce music (or art) to politics – for their differences 'to disappear in the indistinction of ethics' (Rancière 2010, 215). And if MusDig affirms the urgent need for a conceptual framework for analysing musical politics that includes (third-plane) collective social identity formations – one that recognises the ways in which 'power is constitutive of the social, ... the inevitable existence of

social antagonisms' (Mouffe 2013, 131), and how music can refract such (third-plane) antagonisms – the chapters show also that the political, when addressed through music, cannot be reduced to this alone (cf. Mouffe 2005). However important, a focus on the politics inflamed by social antagonisms is insufficient to understand the full spectrum of the political rumbling like the distorted frequencies emitted by a bass speaker through the MusDig ethnographies. Music is, then, not just a 'social medium' but a medium ripe for gestating the political – and ethnographic comparison draws attention to the variety and the incommensurability of planetary politics mediating and mediated by digital music-making. Indeed, the copious perspectives on the political opened up by our chapters add a 'minor register', an 'irreducible variation', to politics as conceptualised by anthropology, disturbing also the certainties of political theory, 'challenging the order of the disciplines' (Barry 2017, 590). We should, as Andrew Barry asserts, 'recognize the value of the minor', which leads not towards 'a synthesis, but [towards] an amplification of disjunctions' (Thoburn 2003, 27, cited in Barry 2017, 590).

But a further step can be taken here, for the notion of music as an assemblage makes available conceptually not only means of deciphering the political actualities portrayed in their plangent and vivid multiplicity across the chapters in this book. With its insistence on nonlinearity and emergence, the idea of the assemblage is also attuned to the abundant *political potentialities* of music's prolific mediations – social and material, but also corporeal, discursive, spatial and so on – as they hang together as (digital) music assemblages. This is to phase shift and insist that the comparative framework elaborated here can bring into conceptual awareness not only what has been and is now, but *what might come to be* – summoning novel musico-political imaginaries, albeit in relation to the singular, path-dependent situations we have illuminated ethnographically. To expand on this in relation to occlusions: the hitherto occluded socialities, social relations, social diagrams and institutional formations brought into view by the five planes of social mediation throw light on 'how *differential futures* are distributed' (Stoler 2016, 13) – but also on the diverse forms in which musical politics might arise and how, as a consequence, that distribution might be altered.

As we have seen, the political potentialities of (digital) music are multiple; they range from the molar politics of neoliberal economic policies as they virally entangle themselves in music and culture to the ways in which music acts as a wellspring for molecular politics – given its protean existence as an assemblage, as more than a sound 'object' (Born 2018b), more than a vessel of technological 'mediality' or of social

mediation. As our ethnographies show vividly, the molar and molecular reverberate and rebound in unpredictable ways that may be extraordinarily generative of as-yet-inaudible musical futures – and the time is ripe to grasp these potentialities, which I have heightened through comparison. The direct implication is that the machinery of thought developed in this postlude can be employed not only for critique but for invention – for identifying inequality or domination channelled through music, but also for identifying inventive musico-political directions, for taking musically-imaginative flight. Critique and invention, that is to say, are not as separable or incompatible as some writers suggest.[41]

The politics of ontology deciphered in two chapters adds a final perspective on these matters. Earlier, I drew a contrast between how this appears in Deo's Indian ethnography (chapter 4) and my work in the UK (chapter 8). I described how quite different, 'local' politics are perceptible in each case arising from clashes between contending ontologies of music, clashes permeated with differences of social and/or cultural power that can be diagnosed only with reference to the actors. On the one hand, in India, the politics arose from the perception among a community of Goan musicians from a scheduled caste that an existing, ritually and socially embedded ontology of music was under threat of erasure; on the other hand, in the UK, the politics took the form of an avalanche of creative departures from what had been defining mediations of a hegemonic ontology – that of acousmatic modernism, itself recapitulating the ontology of Western art music. In the Indian case, among Gavda communities in Goa, the music targeted by the national ARCE for community-led digital recording and archiving was deeply embedded in Gavda ritual practices, with the result that the musicians had little interest in the ARCE project, which met resistance and 'failed to transform the local ontology of ... musics into one in which music is experienced as ripe for disembedding, documentation and [online] circulation' (p. 153). In the British case, a hegemonic ontology defined by a denial or marginalisation of music's social, material and spatial mediations was met by a profusion of counter-practices intent on reinfusing the social, material and spatial *into* the ontology of music, recouching music in these mediations by cultivating diverse performance socialities, material set-ups and acoustic-spatial formations, nourishing and enlivening musical sound by elaborating their aesthetic-and-ontological potentials, in these ways reimagining and re-empractising the ontology of (post-) digital art music. What is striking in these alternative versions of a contemporary politics of ontology, stemming from utterly different planetary locales, is that from different directions they arrive at a similarly

‘contrary’ ontological stance: among the Gavda, a resistance to music’s disembedding and abstraction by recording; among British (post-)digital art musicians, an abundance of practices intended to transmute the ontology of Western art music from one predicated on the abstractions of recording (or notation, or the ‘work’) to one in which sound is re-embedded, thickened by novel social, material and spatial mediations.

This discussion requires a last qualification. It should be clear that the conceptual apparatus expounded here does not, and is not intended to, repudiate musical sound as a core element of music and of musical experience. If exploring in depth the imbrication of material, social, political and ontological aspects of music is taken ineluctably to demote the analysis of musical sound, then that is surely not an inevitable conclusion – although it may be understandable for those unfamiliar with anthropology, media studies, STS and other disciplines central to the research presented in this book. Nothing in what is written here, or in the chapters, displaces musical sound as a central mediator of musical experience, certainly not through a spurious social determinism (Bates 2016, 14). Rather, our research suggests that other components of musical experience also matter, that they have been relatively under-appreciated and under-theorised, and that they make clear how music is a rich medium for the renewal of anthropological and social theory.

I finish this book, a ten-year project, in the middle of a pandemic that, compounded by climate emergency, threatens the world we have known. The book stands as a record of what is without doubt a privileged research endeavour in the humanities and social sciences, one that aspires to augment human understanding. At the same time, the book issues a plea to enable the complexity of musical existence and of energetic thought about it to be sustained – even during a life-threatening pandemic. It has become clearer than at any previous point in my lifetime how achingly impoverished existence becomes when bereft of the sensory pleasures, socialities, aesthetic and emotional experiences provided only by music. It seems equally clear that the digital mediation of musical life will intensify; and while others will make sense of those developments, calibrating them in relation to the urgent demands posed by ecological crisis and climate change (Devine 2019), MusDig attests, as I have shown, to a host of resistances and burgeoning alternatives to the abstraction and disembedding of music that the intensification of digital mediation is likely only to amplify further. We do not yet know how musical life will unfold and adapt as the world becomes post-pandemic. ‘A line of becoming has neither beginning nor end, departure nor arrival … A

becoming is always in the middle; one can only get to it by the middle' (Deleuze and Guattari 1987a, 293). I conclude by suggesting, again, that this project amounts finally, merely, to an anthropology in the middle – yet I insist that it could not be otherwise and that this is – must be – a hopeful vantage point.

Notes

1 An exception from ethnomusicology, a discipline that has long addressed the aesthetic, is Bates (2016).

2 See Born (2010b) and Born, Lewis and Straw (2017) for a full exposition of the arguments in this paragraph.

3 In the digital humanities, it is similarly against any notion of the immateriality of digital media that such alternative accounts of digital materiality developed: see Kirschenbaum (2008); Blanchette (2011); Drucker (2013).

4 With multiplicity I invoke Deleuze, multiplicity as 'an organisation belonging to the many as such, which has no need whatsoever of unity in order to form a system … Everywhere the differences between multiplicities and the differences within multiplicities replace schematic and crude oppositions'.

5 Rather than concrescence, Prior's term is convergence.

6 https://www.izotope.com/en/products/nectar/features.html. Accessed 1 February 2022. Warm thanks to Anna Thomas for this insight.

7 https://www.qub.ac.uk/sarc/facilities/. Accessed 1 February 2022.

8 https://www.kraftwerk.at/reference/mumuth/. Accessed 1 February 2022.

9 With 'comprador institution' I draw an analogy with Marxist debates over the comprador bourgeoisie as 'agents or partners of foreign investors who operate' in dependent countries and tend to 'hinder change' (Vitalis 1990, 291).

10 The conceptual dualism pitting musical and/or technological 'amateur' against 'professional' is now being nuanced in relation to both the Global South and North (Baily 1979; Sholette 2011; Bryan-Wilson and Piekut 2020).

11 Photograph from Bowers and Haas (2014, 7), with gratitude: 'Figure 2: [David Tudor's] *Rainforest I* in rehearsal at the Rambert Dance Studios (2009), assorted speaker objects (plastic bin, slinky, wooden box, panettone tin, metal rolling pin, copper sheet, plastic mixing bowl, grille).'

12 For a fuller discussion of scale and social relations, and Strathern's contributions, see Born and Barry (2018).

13 It is worth noting that my listing of these grid-like social identity categories risks failing to convey not only their fluid, overlapping and internally differentiated nature, but the potential for tensions and synergies between them, and their marked or unmarked qualities (Deleuze and Guattari 1987b; Frankenberg 1993; Dyer 1997).

14 With invention I invoke Andrew Barry's felicitous definition, which introduces a conceptual difference between innovation and invention: for Barry, opposing the facile equation of technological innovation with invention, inventiveness is 'an index of the degree to which an object or practice is associated with *opening up possibilities* … [Thus,] what is inventive is not the novelty of artefacts or devices in themselves, but the novelty of the arrangements' in which they are situated (Barry 2007, 299–300, cited also in ch. 6). For objects and practices, I substitute music's mediations – among them the four planes of music's social mediation.

15 To clarify the terms institution and organisation: some anthropologists use 'the term "institution" … synonymously with organisation' (Garsten and Nyqvist 2013, 5), while others distinguish them. The anthropology of organisations is well established (Gellner and Hirsch 2001; Wright 2005; Garsten and Nyqvist 2013), and is sometimes equated with institutional ethnography (Jiménez 2017). I take 'organisation' to refer to a concrete, singular, goal-oriented, more or less formal collective social entity, and 'institution' to refer to a genre of organisation, one that is distributed, endures and may have different organisational expressions. This heuristic definition aligns with the framework outlined here, and it contrasts

with the formalism and abstraction of sociological and economic theories of institutions and organisations (for example Mohr and White 2008; Scott 2013).

16 A crucial influence on Gibson-Graham and Bear et al. are earlier socialist feminist debates over domestic labour and materialist feminisms: inter alia Delphy (1980 [1970]); Kuhn and Wolpe (1978); Molyneux (1979); Barrett (1980). The debates began in socialist feminist circles (for example *Feminist Review*) and soon spilled into mainstream left and economics journals (*New Left Review*, *Cambridge Journal of Economics*); yet the challenges they posed to liberal and Marxist political economy all but disappeared until these important resurfacings.

17 TRIPS is the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights.

18 The effectiveness of the performativity of such policies cannot be assumed. See Campbell et al. (2018, 347) on 'how the definition of "creativity" used to demonstrate [creative industries'] economic performance remains contested and variable'. And conceptually, as Judith Butler reminds us of J. L. Austin's idea of 'perlocutionary' performativity: 'A politician may claim that "a new day has arrived" but ... the utterance alone does not bring about the day, and yet it can set in motion a series of actions that can ... bring the day around' (Butler 2010, 147–8).

19 The crucial change brought about by the terminological shift from 'cultural' to 'creative' industries was to gather under this category the economic performance of the IT and media industries as well as that of the arts (cf. Campbell et al. 2018).

20 For further discussion see Hesmondhalgh (2002); O'Connor (2007, 2011); Frith et al. (2009); Behr (2015).

21 Including Amartya Sen (2001, 2006); Jon Hawkes (2001); and Keith Nurse (2006a, 2006b).

22 UNCTAD's 2008 *Creative Economy Report* was a milestone in the emerging international policy discourse (Towse and Handke 2013, 2); see also http://www.unesco.org/new/en/culture/themes/culture-and-development/. Accessed 1 February 2022.

23 Quoted in Deo and Eisenberg (2013, 1).

24 https://ahrc.ukri.org/innovation/creative-economy-research/the-creative-industries-clusters-program/. Accessed 1 February 2022.

25 Michel Callon invokes 'bifurcation' (Whitehead 1978 [1929]) when debating with Judith Butler (Callon 2010, 164; Butler 2010) whether a focus on the performativity of economics reproduces a self-evident ontological division between the economy and politics, with two risks: that of marginalising the role of politics (and policies) in the very designation of the economy, and that of assuming that performativity 'unproblematically works' (du Gay 2010, 174).

26 https://c4dm.eecs.qmul.ac.uk/. Accessed 1 February 2022.

27 See, for example, Canada's GRAND (Graphics, Animation and New Media) Network of Centres of Excellence, created in 2009 'to employ an interdisciplinary ... approach to address Canada's technological, creative, socio-economic, legal and cultural challenges in digital media', a research network linking 250+ researchers at 33 universities in 9 provinces, with 184 industry and other partners: http://grand-nce.ca/about/. Accessed 1 February 2022.

28 Interview with a leading figure in Hexagram's formation, September 2011.

29 See https://www.dnb.com/business-directory/company-profiles.ableton_ag.a4fda471f30f7dd4663ae5141eb1a38b.html#competitors. Accessed 1 February 2022.

30 A body of work is emerging on the internet as infrastructure: see Starosielski (2015); Parks and Starosielski (2015); Winseck (2017); and for a compelling overview, Hesmondhalgh (2021).

31 It is only in recent years that a politics of gender has begun to take off in contemporary art music in the North (Born and Devine 2016; Born and Hodkinson 2017; Born 2018a), less clearly in digital art music. A politics of race remains even less developed.

32 For Foucault, a diagram (his model is the Panopticon) is 'a mechanism of power reduced to its ideal form; ... a figure of political technology ... detached from any specific use' (Foucault 1977, 205). Deleuze (1988, 34, 37) elaborates, portraying the diagram as a 'cartography that is coextensive with the whole social field', the 'cause of the concrete assemblages that execute its relations [where such power relations] take place ... within the very tissue of the assemblages they produce'.

33 Klout operated from 2008 to 2018: https://en.wikipedia.org/wiki/Klout. Accessed 1 February 2022.

34 For similar takes on algorithmic governmentality see Cheney-Lippold (2011); Roberge et al. (2019); Henman (2020). This argument echoes – and with its stress on social mediation adds to – Bratton's (2015) theory of 'planetary-scale computation' in the guise of the Stack: a

'modular interdependent order' embodying strong forms of governmentality, 'less a new medium of governance than … a form of governance in and of itself' (Bratton 2015, 373). The Stack is 'a combination of platforms', where platforms are 'simultaneously organizational forms that are highly technical, and technical forms [enabling] extraordinary organizational complexity to emerge' (Bratton 2015, 41–2).

35 See also Parikka (2011) on Ernst's 'materialist media diagrammatics', where Parikka attempts similarly to address via Foucault and Deleuze how the 'diagrammatics of machines' are 'constantly operationalizing social and cultural functions into algorithmic contexts' (Parikka 2011, 66–7).

36 Blake Durham, personal email communication, 11 November 2020.

37 On molar and molecular politics see Surin (2005); Conley (2005); Grossberg (2014). Grossberg cautions against romanticising the molecular in left political thought when the 'binary division between statist and autonomous theory and politics is [treated] as if there were a "chain of equivalences" between it and molar/molecular'. The result is a tendency to assume that '"true" resistance is always "molecular"', a conviction that can herald 'the exhaustion of politics in the certainty of a prefigurative politics of experimentation and multiplicity' (Grossberg 2014, 15).

38 For just one instance at the time of writing of the eruption of gender politics around major institutions of European new music and technological art, here Germany's ZKM, see https://www.swr.de/swr2/musik-klassik/artikel-zkm-veranstaltung-ohne-frauen-100.html. Accessed 1 February 2022.

39 Stoler (2016) deploys occlusion to similar effect when probing 'occluded histories of empire', those 'acts of obstruction – of categories, concepts, and ways of knowing that disable linkages to imperial practice'. To occlude 'is an act that … conceals, creates blockages, and closes off', and it is central to 'colonial aphasia' as a '*political condition*' (2016, 12), necessitating that we 'treat occlusions as subjects of inquiry in their own right' (2016, 10).

40 This tendency was apparent in our research in the UK, Europe and Montreal. I myself became embroiled in it as an advisor to the Defragmentation project run by European 'new music' festivals, funded by the German Federal Cultural Foundation (https://internationales-musikinstitut.de/en/ferienkurse/defragmentation/). I thank my co-advisor George Lewis for forcefully bringing this tendency to my attention. Accessed 1 February 2022.

41 The stance articulated here is clearly opposed to those who, translating Latour's critique of 'critique' (Latour 2004) into the humanities, propose that there is a stand-off between attending to how a text 'reveals or conceals ... the social conditions that surround it' and becoming aware of 'what it sets alight in the reader' (Felski 2015, 179).

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Anthropology has neglected the study of music. *Music and Digital Media – A Planetary Anthropology* shows how and why this should be redressed. It does so by enabling music to expand the horizons of digital anthropology, demonstrating how the field can build interdisciplinary links to music and sound studies, digital/media studies, and science and technology studies. Through ethnographies of popular, folk, art and crossover musics in the global South and North, as well as music platforms and music software, the book presents the first comparative portrait of music's entanglement in digital media worldwide. The chapters propose radical new theoretical directions for understanding digital media through music, demonstrating that music is where the promises and problems of the digital attain clamouring audibility. *Music and Digital Media* develops an inventive model for comparative anthropology responsive to decolonisation. It creates a framework for analysing the social and political in music of wider relevance to anthropological and social theory. And it shows how music enlarges anthropology while demanding to be understood with reference to classic themes of anthropological theory.

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